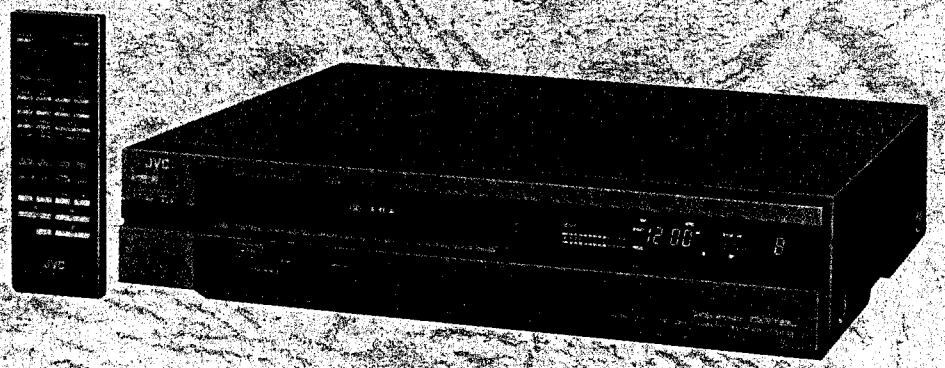
V12177

JVC

SERVICE MANUAL

Hi-Fi STEREO VIDEO CASSETTE RECORDER

HR-D630U



digital

HQ High Quality

SPECIFICATIONS

Format	: VHS NTSC standard with Hi-Fi audio
Video recording system	: Rotary, two-head helical scan system with slant double-azimuth combination video heads
Hi-Fi audio recording system	: Deep-layer recording system conforming to stereo Hi-Fi VHS standard
No. of audio channels	: 2 Hi-Fi audio channels 1 normal audio channel
Video signal system	: NTSC-type color signal
Tape width	: 12.65 mm (1/2 inch)
Tape speed	
(SP)	: 33.35 mm/s (1-5/16 ips)
(EP)	: 11.12 mm/s (7/16 ips)
Maximum recording time	
(SP)	: 160 min. with T-160 video cassette
(EP)	: 480 min. with T-160 video cassette
Temperature	
Operating	: 5°C to 40°C (41°F to 104°F)
Storage	: -20°C to 60°C (-4°F to 140°F)
Antenna	: 75 ohms, unbalanced
Channel coverage	
(VHF)	: Channels 2 – 13
(UHF)	: Channels 14 – 69
(CATV)	: 113 channels
RF output signal	: Channel 3 or 4 (switchable; preset to channel 3 when shipped) 75 ohms, unbalanced
Power requirement	: AC 120 V~, 60 Hz
Power consumption	: 44 W
Video	
Input	: 0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output	: 1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio	: 45 dB (Rohde & Schwarz noise meter) with PICTURE SHARPNESS control at center position
Horizontal resolution	: 240 lines with PICTURE SHARPNESS control at center position
Audio	
Input	: -8 dBs, more than 50 k-ohms, unbalanced
Output level	: -6 dBs, high impedance load
Output impedance	: Less than 1 k-ohm, unbalanced
Signal-to-noise ratio	: More than 40 dB (Normal audio)
Frequency range	: 70 Hz to 10,000 Hz (Normal audio)
Hi-Fi audio	
Frequency response	: 20 Hz to 20,000 Hz
Dynamic range	: More than 90 dB
Wow and flutter	: Less than 0.005 % WRMS
Timer	: 14-day programmable timer 8 programs with repeat function
Dimensions	: 435 mm(W) x 95 mm(H) x 379 mm(D) (17-3/16" x 3-3/4" x 14-7/8")
Weight	: 8.0 kg (18.0 lbs)
Provided accessories	: Infrared remote control unit "AA"-size battery x 2 Matching transformer Antenna extension cable Antenna splitter Antenna cable (F-type) Audio cable Video cable

Specifications shown are for SP mode unless otherwise speeified.
Design and specifications subject to change without notiee.

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No. 82029
January 1988

NOTE: For a technical description, please refer to Technical Guide VTG82016 HR-D030 NTSC.

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▒) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors

5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

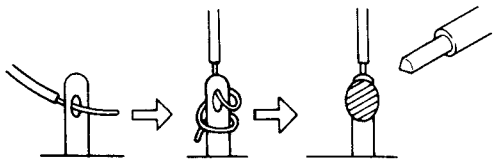

Fig. 1

6. Observe that wires do not contact heat producing parts (heat-sinks, oxide metal film resistors, fusible resistors, etc.)

7. Check that replaced wires do not contact sharp edged or pointed parts.

8. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

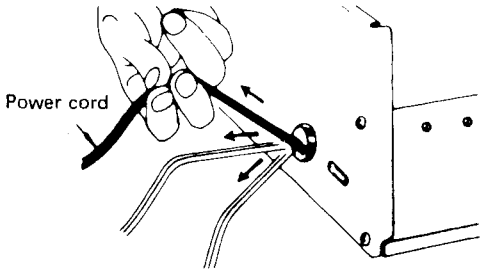

Fig. 2

9. Also check areas surrounding repaired locations.

10. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

11. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.
    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

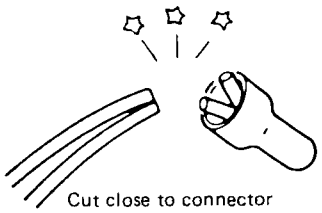

Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

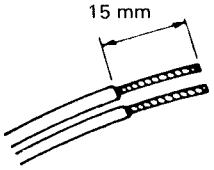

Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

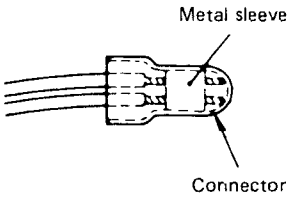

Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

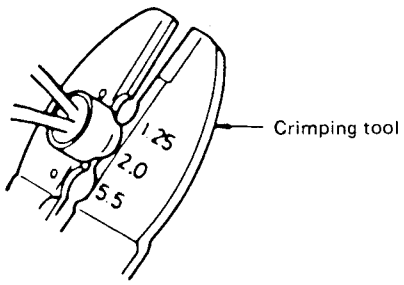

Fig. 6

(5) Check the four points noted in Fig. 7.

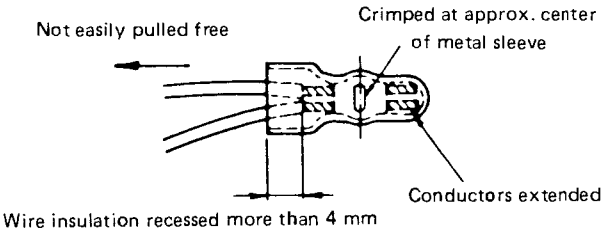
Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.

2. **Dielectric strength test**
Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.

3. **Clearance distance**
When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table below.

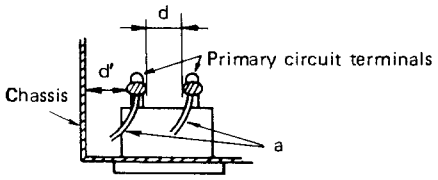

Fig. 8

4. **Leakage current test**
Confirm specified or lower leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method: (Power ON)
Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

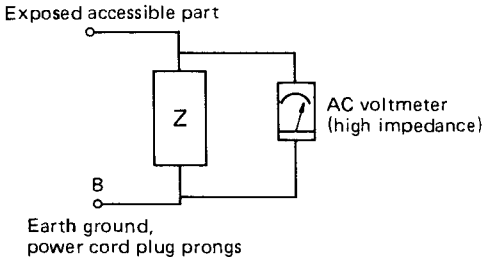

Fig. 9

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	≧ 1 MΩ/500 V DC	1 kV 1 minute	≧ 3 mm
110 to 130 V	USA & Canada	–	900 V 1 minute	≧ 3.2 mm
*110 to 130 V 200 to 240 V	Europe Australia	≧ 10 MΩ/500 V DC	4 kV 1 minute	≧ 6 mm (d) ≧ 8 mm (d') (a: Power cord)

*Class II model only.

Table 1 Ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (b) to:
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF, 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current ratings for selected areas

Note: This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

INSTRUCTIONS

CAUTION
RISK OF ELECTRIC SHOCK DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Note to CATV system installer:
This reminder is provided to call the CATV system installer's attention to Article 820-22 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

This video cassette recorder should be used with AC 120 V~, 60 Hz only.
CAUTION:
To prevent electric shocks and fire hazards, do NOT use any other power source.

CAUTION
When you are not using the HR-D630U for a long period of time, it is recommended that you disconnect the power cord from the AC outlet.

CAUTION
TO PREVENT ELECTRIC SHOCK DO NOT USE THIS POLARIZED PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION:
Pour prévenir l'électrocution, ne pas utiliser cette fiche polarisée avec un prolongateur, une prise de courant ou une autre sortie de courant, sauf si les lames peuvent être insérées à fond sens en laisser aucune partie à découvert.

VHS HQ

- Only cassettes marked "VHS" can be used with this videc cassette recorder.
- HQ VHS is compatible with existing VHS equipment.

Thank you for purchasing the JVC HR-D630U Hi-Fi Stereo Digital Video Cassette Recorder.
Before using this video recorder, read this instruction booklet carefully so that you will obtain the best results from your HR-D630U.

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NOTE: The rating plate and the safety caution are on the rear of the unit.

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A Consumer Video Products Safety Guide

Electrical energy can perform many useful functions. But improper use can result in potential electrical shock or fire hazards. This unit has been engineered and manufactured to assure your personal safety. In order not to defeat the built-in safeguards, observe the following basic rules for its installation, use and servicing.

ATTENTION:
Follow and obey all warnings and instructions marked on your video product and its operating instructions. For your safety, please read all the safety and operating instructions before you operate this unit and keep this brochure and the operating instructions packaged with your video product for future reference.

INSTALLATION

1. Grounding or Polarization
(A) Your video product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature.'
If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.
(B) Your video product may be equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the sefety purpose of the grounding-type plug.

2. Power Sources
Operate your unit only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your appliance dealer or local power company. If your unit is intended to operate from battery power, or other sources, refer to the operating instructions.

3. Overloading
Overloaded power outlets and extension cords are dangerous; so are frayed cords and broken plugs. Any of these may result in a shock or fire hazard. Cail your service technician for replacement of such cords and plugs. Extension cords or adaptors that defeat the safety purpose of polarized or 3-wire grounding-type plug power cords should not be used.

4. Power Cord Protection
Power supply cords shcuid be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

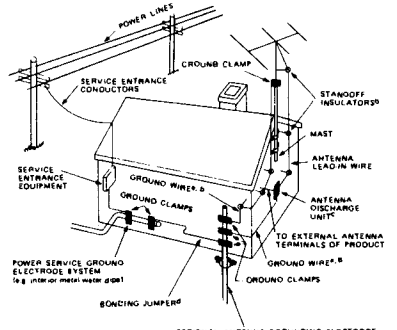
5. Ventilation
Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the unit and to protect it from overheating, these openings must not be blocked or covered.
- Do not block the openings by placing the unit on a bed, sofa, rug or other similar surface.
- Do not place the unit near or over a radiator or heat register.
- Do not place the unit in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

ANTENNA INSTALLATION INSTRUCTIONS

1. Outdoor Antenna Grounding
If an outside antenna or cable system is connected to the video recorder or tuner, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code. ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes and requirements for the grounding electrode.

2. Power Lines
To avoid the possibility of a fatal electrical shock, outdoor antennas and lead-in wires should be kept well away from over-head power lines or other electric light or power circuits, or from where they can fall onto such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal.

EXAMPLE OF ANTENNA GROUNDING ACCORDING TO NATIONAL ELECTRICAL CODE INSTRUCTIONS CONTAINED IN ARTICLE 810 – "RADIO AND TELEVISION EQUIPMENT"



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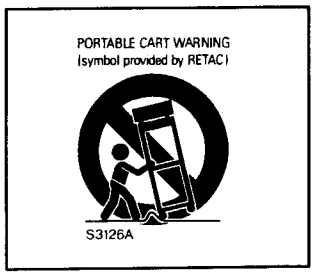
a
Use No. 10 AWG (5.3 mm^2) copper, No. 8 AWG (8.4 mm^2) aluminum, No. 17 AWG (1.0 mm^2) copper-clad steel or bronze wire, or larger, as a ground wire.
b
Secure antenna lead-in and ground wires to house with stand-off insulators spaced from 4 – 6 feet (1.22 – 1.83 m) apart.
c
Mount antenna discharge unit as close as possible to where lead-in enters house.
d
Use jumper wire not smaller than No. 6 AWG (13.3 mm^2) copper, or the equivalent, when a separate antenna-grounding electrode is used. See NEC Section 810-21 (j).

USE

1. Accessories
To avoid personal injury:
- Do not place this video product on an unstable cart, stand, tripod, bracket, or table. It may fall, causing serious injury to a child or adult, and serious damage to the appliance.
- Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer or sold with the video product.
- Use a mounting accessory recommended by the manufacturer and follow the manufacturer's instructions for any mounting of the appliance.
- Do not try to roll a cart with small casters across thresholds or deep-pile carpets.

1A.
An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.



2. Water and Moisture
Do not use this video product near water – for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool and the like.

3. Object and Liquid Entry
Never push objects of any kind into this video product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on this video product.

4. Attachments
Do not use attachments not recommended by the manufacturer of this video product as they may cause hazards.

5. Cleaning
Unplug this video product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

6. Lightning
For added protection for the video recorder or tuner during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the video product due to lightning and power-line surges.

SERVICING

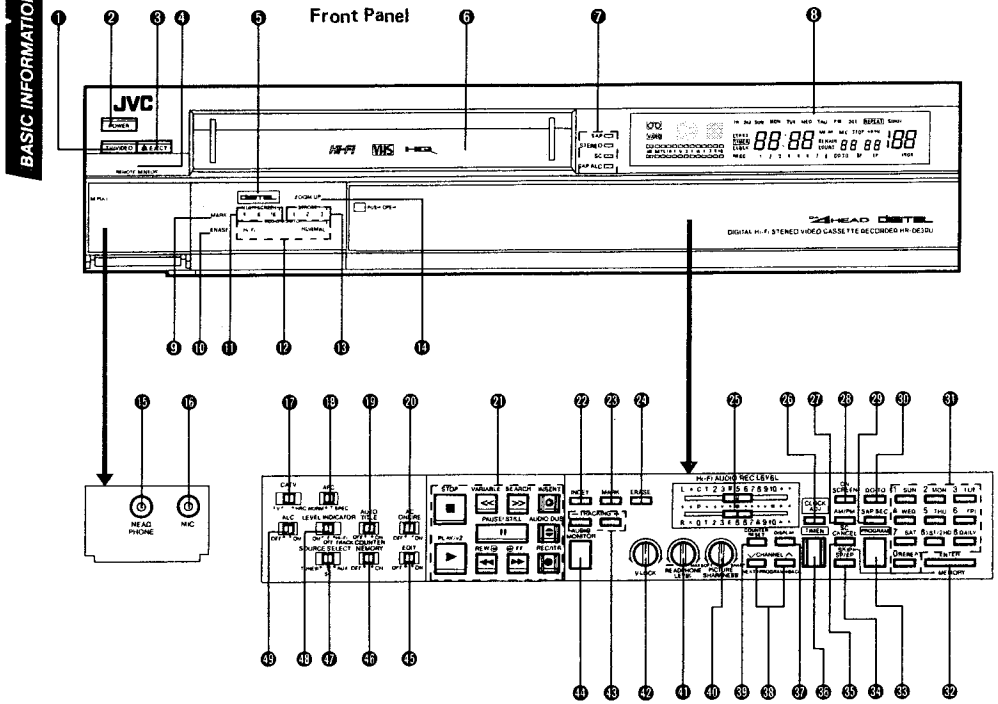
1. Servicing
If your video product is not operating correctly or exhibits a marked change in performance and you are unable to restore normal operation by following the detailed procedure in its operating instructions, do not attempt to service it yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

2. Damage Requiring Service
Unplug the video product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
a. When the power supply cord or plug is damaged.
b. If liquid has been spilled, or objects have fallen into the video product.
c. If the video product has been exposed to rain or water.
d. If the video product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the video product to its normal operation.
e. If the video product has been dropped or the cabinet has been damaged.
f. When the video product exhibits a distinct change in performance – this indicates a need for service.

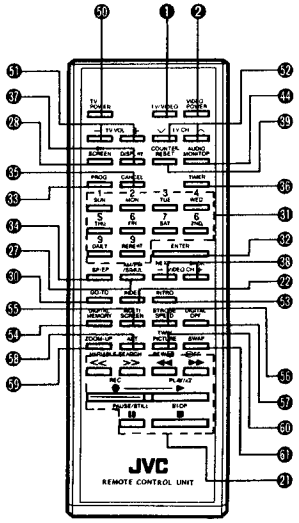
3. Replacement Parts
When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.

4. Safety Check
Upon completion of any service or repairs to this video product, ask the service technician to perform safety checks to determine that the video product is in safe operating condition.

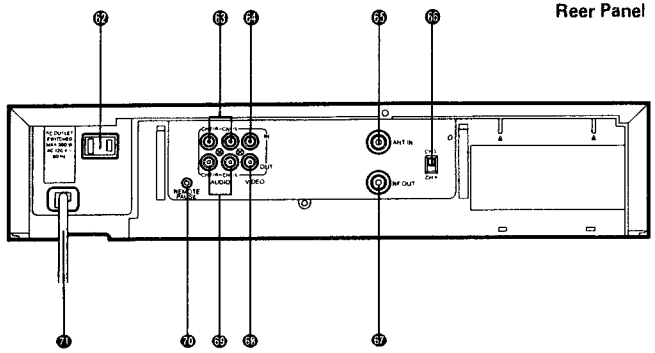
GENERAL REFERENCE DIAGRAMS



Remote Control Unit



Reer Panel



FEATURES

Digital Functions

- **Digital Freeze** to freeze the action during recording or while watching a regular TV broadcast, as well as during playback, with the soundtrack continuing unaffected.
- **Multi-Screen Digital Freeze** to display selected still pictures on sub-screens in the 4-, 9- or 16-frame Multi-Screen mode.
- **Digital Strobe** to change "frozen" images in sequence at 3 different speeds.
- **Multi-Screen Digital Strobe** to display still pictures on sub-screens in the Multi-Screen mode at 3 different speeds.
- **Picture-In-Picture** to display a broadcast program in an inset window during tape playback.
- **Swap function** to switch pictures between the main screen and window in the Picture-In-Picture mode.
- **Digital Mosaic** for modern art effects available in 2 different patterns.
- **Digital Solerization** for fascinating color changes in 2 different tones.
- **Digital Zoom** to enlarge the desired quarter of the picture into a full-screen picture.
- **Multi-Screen Channel Scan** to sequentially display on sub-screens a still picture from each tuned-in channel.
- **Intro Search** to play back the beginning of each recorded program identified by an index code, for about 5 seconds in fast-motion.
- **Multi-Screen Intro Search** to sequentially display on sub-screens a still picture from the beginning of each recorded program identified by an index code.
- **Automatic Recording of a Multi-Screen Intro Search image;** after the entire tape is scanned in the Multi-Screen Intro Search mode, the multi-screen picture is automatically recorded for about 10 seconds at the beginning of the tape.
- **Digitally-enhanced still, double-speed, 5-step variable slow-motion, and variable fast-motion playback.**

Special Featuras

- **Auto Titler** to automatically record the date, time and channel at the beginning of a recording each time recording is initiated; in playback, the recorded data can be displayed on-screen.
- **Flying erase head** for professional-class insert edits.
- **VHS Index Search System** with mark/erase functions; the half-loading mechanism allows the detection of index codes in the rewind, fast-forward and Shuttle Search modes.
- **Full-function remote control:** available functions include:
  - All digital functions
  - All tape access functions
  - On-screen timer programming
  - 10-Key direct-access channel selection
  - Audio monitor selection
  - Control of television for power on/off, channel selection and volume

High-Ouelity Picture and Sound

- **Full set of HQ (High Quality) System circuits:** Luminance Noise Reduction, Chrominance Noise Reduction, Detail Enhancer and a higher white clip level.
- **Luminance signal comb filter.**
- **Hi-Fi VHS stereo sound with a dynamic range of more than 90 dB.**
- **New switching noise reduction system** which applies switching point compensation independently for each channel.

Other Value Features

• Double-Azimuth 4-head (DA-4) system • 181-Channel cable-compatible frequency synthesized tuner • Built-in MTS decoder • 14-Day/8-event fully programmable timer • On-screen mode check and programming • Audio dubbing • Edit switch for best possible edits • Hi-Fi recording level control with ALC switch • Peak-hold audio level indicators/ Hi-Fi tracking meter • Timer-programmable FM simulcast recording • 60-Minute memory backup • Overlapped program warning • Timer program review • Instant timer recording • Counter go-to function • Counter memory function • Next-function memory • Remaining tape time indicator • Automatic functions • Shuttle Search with latch function • Picture sharpness control • Electronic tracking controls • Switchable AC outlet

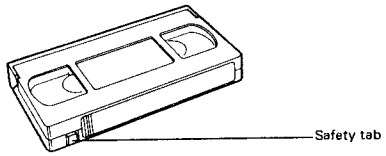
PRECAUTIONS

Handling and storage

- Avoid using the recorder under the following conditions:
  - extremely hot, cold or humid places,
  - dusty places,
  - near appliances generating strong magnetic fields,
  - places subject to vibrations, and
  - poorly ventilated places.
- Be careful of moisture condensation.
  Avoid using the recorder immediately after moving from a cold place to a warm place. The water vapor in warm air will condense on the still-cold video head drum and tape guides and may cause damage to the tape and the recorder.
- Handle the recorder carefully.
  - Do not block the ventilation openings.
  - Do not place anything heavy on the recorder.
  - Do not place anything which might spill and cause trouble on the top cover of the recorder.
  - Use in horizontal (flat) position only.
- In case of transportation,
  - Avoid violent shocks to the recorder during packing and transportation.
  - Before packing, be sure to remove the cassette from the recorder.

Video cassettes

- This recorder employs VHS-type cassettes only.
  T-160 for 160/480 minutes, T-120 for 120/360 minutes, T-90 for 90/270 minutes, T-60 for 60/180 minutes and T-30 for 30/90 minutes of recording.
- Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be performed. If you wish to record on a cassette whose tab has already been removed, use adhesive tape to block the hole.



- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, violent vibrations or shocks, strong magnetic fields (near a motor, transformer or magnet) and dusty places.
- Placa the cassettes in cassette cases and position vertically.

Moisture condensation

- If you pour a cold liquid into a glass, water vapor in the air will condense on the surface of the glass. This is called moisture condensation.
- Moisture condensation on the head drum, one of the most crucial parts of the video recorder, will cause damage to the tape.
- Moisture in the air will condense on the recorder when you move it from a cold place to a warm place, or under extremely humid conditions.
- In conditions where moisture condensation may occur, keep the power cord plugged in an AC outlet and the POWER switch set to ON; this would help prevent condensation from occurring. When condensation has occurred, it will not evaporate quickly once the power is switched on. Wait a few hours for the recorder to become dry.

Operation

- When a cassette is loaded, the power is switched on and, if the safety tab has been removed, playback begins automatically.
- The cassette can be unloaded even when the power is off. Pressing the EJECT button turns the power on and, after ejection of the cassette, shuts it off automatically in this case.
- As long as the TIMER button is engaged with the TIMER indicator lit, the POWER and EJECT buttons have no effect and unloading of a cassette is not possible. If a cassette has not yet been inserted, simply insert a cassette; the power will be switched on to load the cassette properly and, after completion of automatic loading, the Timer Recording Standby mode will be engaged with power off.

Remote control unit

- Avoid violent shocks, especially take care not to drop the unit.
- Take care not to allow liquid to spill into the unit or dampen the terminals.
- Do not place heavy objects on the unit.
- Avoid leaving the unit in places subject to direct sunlight or extremely high temperatures.

CONTROLS, INDICATORS AND CONNECTORS

Front Panal

❶ TV/VIDEO button
Selects between TV and VIDEO modes.
TV mode (the VIDEO indicator on the fluorescent display [FDP] is off): for TV viewing and for watching a TV program while recording another.
VIDEO mode ("VIDEO" appears on the FDP): for recording a TV program while watching it and for playing back recorded tapes. When the power is switched on, initially the TV mode is engaged. If you want to change the mode, press the TV/VIDEO button.

❷ POWER button with green indicator
Press to apply power to the HR-D630U for recording or playback. The indicator will light. Loading a cassette also turns the power on.

❸ Cassette EJECT button

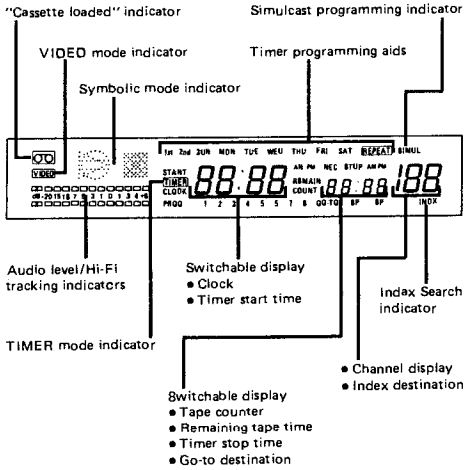
❹ Infrared beam receiving window (REMOTE SENSOR)

❺ DIGITAL indicator
Lights when a digital function is in operation.

❻ Cassette loading slot
Insert a VHS video cassette. The door will close and the indicator showing that a cassette is inside will appear on the FDP.

❼ Audio program indicators
SAP: Lights when a TV program accompanied by a second audio program is being received.
STEREO: Lights when a stereophonic program is being received.
SC: Lights when the SOURCE SELECT switch ㊽ is set to SC.
SAP REC: Lights when the SAP REC button ㉘ is pressed to record a second audio program on the normal audio track.

❽ Comprehensive fluorescent display panel (FDP)
Fully explained in relevant sections.



❾ MARK indicetor
Blinks while an index code is being recorded.

❿ ERASE indicator
8links while an index code is being erased. (The Erase mode is engaged by pressing the ERASE button.)

⓫ MULTI SCREEN indicators
An indicator (4, 9 or 16) corresponding to the selected number of sub-screens lights in the Multi-Screen mode.

⓬ AUDIO MONITOR indicators
The Hi-Fi indicator lights when Hi-Fi audio is selected with the AUDIO MONITOR button ⓭; the NORMAL indicator lights when normal audio is selected. Both indicators light when a mixture of the two is selected.

⓮ STROBE indicators
An indicator (1, 2 or 3) corresponding to the selected strobe speed lights in the Strobe mode.

⓯ ZOOM UP indicator
Lights when the Digital Zoom is engaged.

⓰ HEADPHONE jack
Connect a set of headphones for monitoring or private listening.

⓱ MIC jack
Connect a microphone for audio dubbing.

⓲ Band select switch (TV/CATV/HRC)
TV position: If your antenna system is regular broadcast VHF/UHF, VHF only or UHF only, set to this position.
CATV position: If your antenna system is a Cable TV Line with or without a CATV channel converter/decoder unit, set to this position.
HRC position: If your antenna system is an HRC (Harmonic Related Carrier) line, set to this position.

⓳ AFC switch
Normally set this switch to NOR. If no picture appears, reset the switch to SPEC.

⓴ AUTO TITLE switch
When this switch is set to ON, the date, time and channel are automatically recorded at the beginning of a recording each time recording is initiated from the Stop or Timer Standby mode. (See page 23.)

㉑ AC ONLINE switch
OFF position: Power flows through the rear panel AC OUTLET ㉑ regardless of whether the recorder is on or off.
ON position: Power flows only when the recorder is on. When used in combination with the built-in timer, this enables timer-controlled power supply for the connected equipment.

㉒ Tape control buttons
- **STOP button**
  To stop the tape.
- **PLAY/x2 button**
  Press once to play back a tape; press again for double-speed playback. Also press this button to cancel the Pause/Still, Slow or Shuttle Search mode. (See page 22.)
- **REC/ITR button**
  Press once for normal recording; again for instant timer recording; aach subsequent press adds 30 minutes to the recording time to a maximum of 4 hours. (See page 24.)
- **PAUSE/STILL button**
  Press to stop the tape temporarily to avoid recording of unwanted material or to view a still picture. The still picture can be advanced each time this button is pressed.
- **REW button**
  To rewind the tape, press this button while in the Stop mode. To view the speeded-up picture in the reverse direction for program search, press this button while in the Play mode; press the PLAY/x2 button to return to normal playback. (See page 22.)
- **FF button**
  To fast forward the tape, press this button while in the Stop mode. To view the speeded-up picture in the forward direction for program search, press this button while in the Play mode; press the PLAY/x2 button to return to normal playback. (See page 22.)
- **VARIABLE SEARCH buttons**
  To control the search speed; both slow-motion and fast-motion search are available. The slow-motion speed can be changed in 5 steps; 1/6, 1/12, 1/18, 1/24 and 1/30 normal speed. For fast-motion search, available speeds are x1, x3, x5 and x7 in both directions and x2 in the forward direction in the SP mode; x1, x5, x7 and x21 in both directions and x2 in the forward direction in the EP mode. No audio is available in the Variable Search mode. To cancel the Variable Search mode, press the PLAY/x2 button. (See page 22.)
- **INSERT button**
  Press for insert editing. (See page 38.)
- **AUDIO DUB button**
  Press together with the PLAY/x2 button for audio dubbing. (See page 37.)

㉓ INDEX button
Press to engage the Index Search mode. (See page 26.)

㉔ INDEX MARK button
Press during playback or recording to put an index code onto the tape. (See page 26.)

㉕ ERASE button
Press during playback to erase an index code. (See page 26.)

㉖ Hi-Fi AUDIO REC LEVEL controls
See page 17.

㉗ CLOCK ADJ button
Press this button for clock setting. (See page 19.)

㉘ AM/PM/SC button (AM/PM/SIMUL on remote control)
Press this button to specify AM or PM in clock or timer setting. This button is also used to program timer-controlled FM simulcast recording.

㉙ ON SCREEN button
The 5-second on-screen display for mode check is automatically available each time the mode is changed or called up manually by pressing the ENTER button ㉜ or this ON SCREEN button. (See page 20.) The on-screen display for timer programming, which is called up by pressing the PROGRAM button ㉛, can be cancelled by pressing the ON SCREEN button. (See page 34.)

㉚ SAP REC button
Press this button when recording the SAP program on the normal audio track. The SAP REC indicator will light.

㉛ GO-TO button
Press to engage the counter Go-To mode. (See page 28.)

㉜ Multi-purpose numeric keys
Channel selection : Page 13
Clock setting : Page 19
Index Search : Page 26
Counter Go-To : Page 28
Timer programming : Page 35

㉝ ENTER button
Press to restore a skipped channel or to tune to the selected channel instantly (see page 14). Also use to call up the mode check display on the TV screen (see page 20) or for timer programming and clock setting.

㉞ PROGRAM button
Press this button when you want to preset the timer for unattended recording. (See page 35.)

㉟ SP/EP select button
Press to SP position when you wish recordings to be made in the SP (Standard Play) mode. When you wish to record longer TV shows or for unattended and prolonged recording of a number of TV shows with a combined time of up to 8 hours (with a T-160 cassette), press to EP (Extended Play).

㊱ CANCEL/SKIP button
Press to skip unnecessary channels. (See page 14.)
In the program set mode, it can function as the CANCEL button. (See page 36.)

㊲ TIMER button
Press to engage the Timer Standby mode after you have preset the timer for unattended recording.

㊳ DISPLAY button
Press to switch the smaller 4-digit display from tape counter to remaining tape time display, or vice versa. (See pages 24 and 27.)

㊴ CHANNEL (NEXT/BACK) buttons (VIDEO CH on the remote control)
Press either button to select a desired channel. Can also be used as cursor keys in clock setting and timer programming.

㊵ COUNTER RESET button

㊶ PICTURE SHARPNESS control
Use this control to make the picture sharper or softer. Effective only for playback pictures. (No effect for recording.)

㊷ Headphone LEVEL control
Adjusts the level of the audio output from the headphone jack ⓰.

㊸ V.LOCK control
When operating in the Still, Freeze or Strobe mode, turn this control to eliminate vertical vibrations of the picture, if observed.

㊹ TRACKING -/+ buttons
If noise bars are seen during playback, use these buttons to reduce them. The tracking is reset to normal when both buttons are pressed together, a cassette ejected, or the power turned off.
These TRACKING controls can also be used to adjust hi-fi tracking, referring to the hi-fi tracking meter. (See page 17.)

⑭ AUDIO MONITOR button
Press to select the audio output. Each time the button is pressed, the soundtrack to be output changes (Hi-Fi stereo, normal, or mixed playback) and is indicated by the Hi-Fi and NORMAL indicators ⑫.

⑮ EDIT switch
Normally set to OFF. For making multi-generation dubs, set it to the ON position. (See page 39.)

⑯ COUNTER MEMORY switch
When this switch is set to ON, the tape will stop automatically at the counter reading of about "0000" in the Rewind or Fast Forward mode.

⑰ SOURCE SELECT switch
For selecting the recording input signal.
TUNER: To record signals coming from the built-in tuner.
SC: To record the video signal and normal audio signal from the built-in tuner and the hi-fi audio signal from the rear panel AUDIO IN connectors. When recording FM simulcast TV programs, use this position.
AUX: To record signals coming from a unit connected to the VIDEO IN and AUDIO IN connectors.

⑱ LEVEL INDICATOR switch
Selects the function of the audio level/hi-fi tracking meter on the FDP.
ON: To obtain the indication of audio level.
OFF: To turn the meter off.
Hi-Fi TRACK: To use the meter for hi-fi tracking adjustment.

⑲ ALC switch
Set to ON to activate the automatic level control circuit for Hi-Fi audio. For manual control of the hi-fi audio recording level, set this switch to OFF and use the Hi-Fi AUDIO REC LEVEL controls ㉑ for adjustment.

Remote Control Unit

The infrared remote control unit gives you full operation control from your viewing position. All control buttons, except those separately explained, have the same function as the corresponding buttons on the recorder. However, in the case of the REC button, to start recording, both the REC and PLAY/x2 buttons must be pressed simultaneously. The maximum operating distance is about 8 m (26 ft).

⑩ TV FOWER button
Press to turn the TV power on or off. (Designated TV models only.)

⑪ TV VOL. -/+ buttons
Press "-" or "+" to decrease or increase the TV's sound volume.

⑫ TV CH ∨/∧ buttons
Press to scan to a desired channel on the TV receiver.

㉔ INTRO button
Press to engage the Intro Search mode. See pages 27 and 33.

㉕ DIGITAL MEMORY button
Press to angage the digital memory for a variety of digital functions. See pages 29 to 33.

㉖ MULTI SCREEN button
Press to select the desired number of sub-screens (4, 9 or 16) for a variety of multi-screen functions. See pages 29 to 33.

㉗ STROBE SPEED button
Press to select the desired strobe speed in the Strobe or Multi-Screen Strobe mode. See page 30.

㉘ DIGITAL OFF button
Press to disangage any digital function and restore normal pictures. See pages 29 to 33.

㉙ ART button
Press to select the desired digital art effects; two different solarization effects and two different mosaic patterns are available in sequence. (See page 31.)

㉚ ZOOM UP button
Press to zoom up the desired quarter of the picture to fill the screen. (See page 31.)

㉛ TWIN PICTURE button
During tape playback, press to display a TV broadcast program in an insert window (Picture-In-Picture mode). Additional pressing of this button shifts the position of the window.

㉜ SWAP button
While in the Picture-In-Picture mode, press to switch the pictures between the main screen and window.

Remote Control Unit

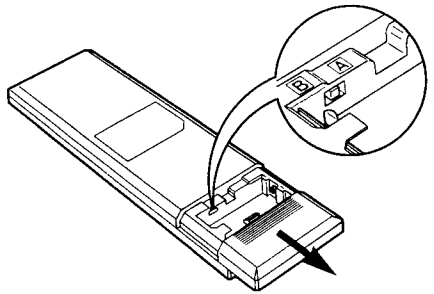
A/B mode switching
A switch on the back of the remote control labelled A/B is accessible when the battery compartment cover is removed.
- This switch is preset to the "A" position. Do not touch it unless you use two JVC video decks side by side.
- When you place two JVC video decks near each other, use this remote control in the "B" mode to prevent both decks from responding simultaneously to this remote control's signals. For this purpose, carefully follow the instructions below:

(1) Unplug the power cord of the HR-D630U from the AC outlet.
(2) Set the remote control unit's A/B mode switch to "B".
(3) Plug the power cord of the HR-D630U into the AC outlet.
(4) Turn on the power of the HR-D630U using the remote control's VIDEO POWER button.
- The HR-D630U "memorizes" this B code and then will respond only to the signals of this remote control unit. The other deck will respond only to its remote control.

Note:
Do not operate other remote controls after you have plugged the HR-D630U into the AC outlet and before you press the VIDEO POWER button of this remote control.

CAUTION: Some televisions may malfunction in response to this remote control when used in the "B" mode. If this should happen, switch the mode back to "A".

Installing the batteries
1. Slide the battery compartment cover on the rear of the unit in the direction of the arrow (▶).
2. Insert 2 "AA"-size batteries (provided) in the correct directions into the battery compartment.
3. Replace the cover.



Reer Panel

⑥ AC OUTLET
Connect the power cord of othar audio or video equipment (such as an FM tuner) requiring less than 300 watts of power. The power flow through this outlet is controlled by the AC ONLINE switch ⑳.

⑤ AUDIO IN terminals
Connect to the AUDIO OUT terminals of another video recorder for tape-to-tape transfer, or the AUDIO OUT terminals of the camera adapter for camera recording.

④ VIDED IN terminal
Connect to the VIDEO OUT terminal of another video recorder for tape-to-tape transfer, or the VIDEO OUT terminal of the camera adapter for camera recording.

③ ANT IN terminal
Connect the antenna cable or a Cable TV Line. If necessary, use the matching transformer (provided).

② RF output channel select switeh
See "VIDEO CHANNEL SETTING" on page 12.

① RF OUT terminal
Connect to the all-channel antenna connector (female F) of a TV receiver using the antenna cable (provided). If your TV receiver has separate VHF/UHF 300-ohm antenna terminals only, use the antenna splitter (provided) to connect the antenna cable to these terminals.

⑨ VIDEO OUT terminal
Connect to the VIDEO IN terminal of another video recorder for tape-to-tape transfer, or the VIDEO IN terminal of a video monitor for playback.

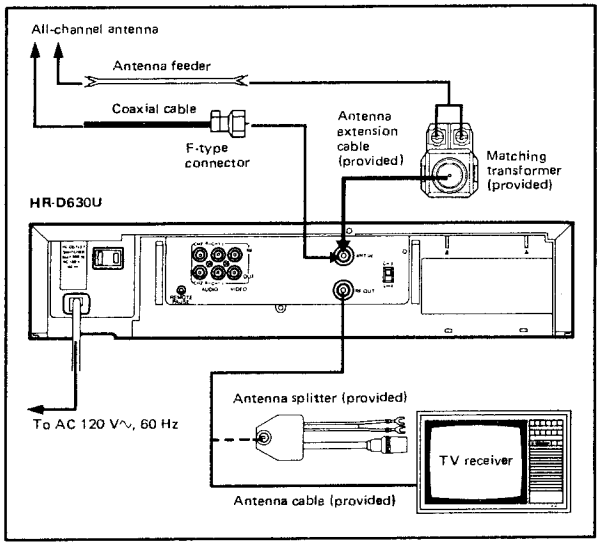
⑧ AUDIO OUT terminals
Connect to the AUDIO IN terminals of another video recorder for tape-to-tape transfer, or the AUDIO IN terminals of a video monitor for playback.

⑳ REMOTE PAUSE terminal
When using a JVC video camera, connect the remote control cable of the camera adapter to this terminal for the purpose of controlling the starting and stopping of the tape with the camera's start/stop switch.

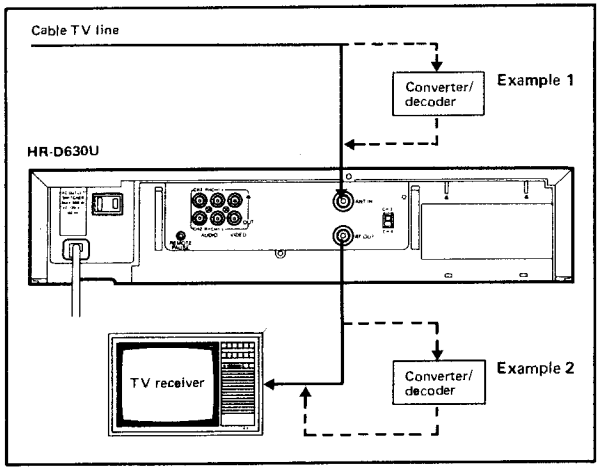
⑦ AC power cord
Connect to an AC 120 V∿, 60 Hz household outlet.

CONNECTIONS

TO VHF AND UHF ANTENNAS



TO CABLE TV LINE



Note:
If your cable TV system does not require a converter/decoder for scrambled signals, you can use the cable-compatible tuner built into the HR-D630U for viewing and recording. In this case, simply connect the cable TV line to the ANT IN terminal of the recorder and the RF OUT terminal of the racorder to your TV receiver. Please contact your cable TV company for any questions concerning hookups or cable TV operation.

Procedure
- Remove the antenna cable from the TV receiver and reconnect to the HR-D630U's ANT IN connector as illustrated. The HR-D630U is then ready to record off-air programs.

Notes:
- If your antenna cable is a 300-ohm flat feeder, use the provided matching transformer .
- If your antenna system has separate VHF/UHF lead-in wires, use an antenna mixer and connect its output to the HR-D630U's ANT IN connector, either directly or through the provided matching transformer depending on the type of the mixer.

- Connect the HR-D630U to the TV receiver using the 75-ohm antenna cable (provided).

Note: If your TV is equipped with 300-ohm UHF input terminals and a 75-ohm VHF input terminal, use the antenna splitter (provided) to complete connection.

As this unit uses the latest digital technology, some care should be taken in connecting the antenna cable. If TV picture interference or distortion occurs, first check whether the proper connections have been made. If there is no improvement, proceed to connect the **provided antenna extension cable** between the matching transformer and the HR-D630U, and place the matching transformer away from the unit so that the picture clears.

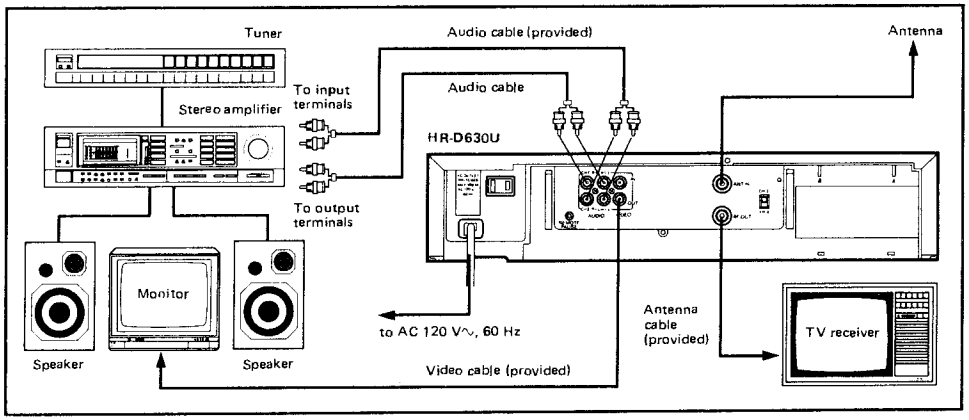
Example 1
- You can record any scrambled cable TV channel while watching it.
- Select the recording channel on the converter/decoder.
- Set the recorder to the output channel of the converter/decoder (channel 3 or 4).
- Set the TV receiver to channel 3 or 4.
- Set the TV/VIDEO button on the recorder to VIDEO (the VIDEO indicator on the FDP lights).

Example 2
- You can record any non-scrambled cable TV channel while watching it or any other channel including "scrambled signal" channels.

Note: "Scrambled signal" channels cannot be recorded.

- Select the recording channel on the recorder.
- Select the viewing channel on the converter/decoder.
- Set the TV receiver to the output channel of the converter/decoder (channel 3 or 4).
- Set the TV/VIDEO button as necessary.

TO A STEREO SYSTEM



Procedure
- Connect the AUDIO IN L and R connectors of the HR-D630U to the recording output terminals of the amplifier. (Exactly as one hooks up an audio cassette deck.)
- Connect the AUDIO OUT connectors of the HR-D630U to the AUX IN or TAPE MONITOR terminals of the amplifier.

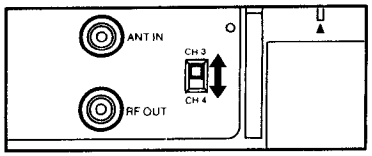
Application
- With this setup, you can enjoy prerecorded Hi-Fi VHS tapes in stereo while viewing them on a regular TV receiver, and also you can record FM simulcast television programs with hi-fi audio accompaniment. See page 37.
- You can also record only audio (without recording any video signal) on both hi-fi and longitudinal audio tracks. This means you can record a continuous 6-hour FM program onto a single cassette (T-160 cassette). See page 37.
- If you want to timer-control the recording of FM simulcast programs, connect the tuner's power cord to the HR-D630U's AC outlet. Set the AC ONLINE switch to ON, and both the tuner and the HR-D630U will be switched on at a time preprogrammed by the HR-D630U. Timer-controlled recording of FM simulcast programs is not possible with the type of tuners which reset the channel each time the power is switched off.

CAUTION:
- The HR-D630U has a dynamic range of more than 90 dB with regards to its hi-fi audio capability. It is recommended that you check the maximum level if you are going to listen to the hi-fi audio signals through a stereo amplifier. A sudden surge in speaker input may cause speaker damage.
- Some speakers and televisions are specially shielded to prevent television interference. If both are of the non-shielded type, do not place the speakers adjacent to the TV set, otherwise the video playback picture will not be normal because of mutual interference.

VIDEO CHANNEL SETTING

The built-in RF converter permits playback of video and audio recordings through a TV receiver.
The signals from the RF converter are viewed through a vacant channel not used for broadcasting in your viewing area.

(Rear)



The converter channel of all units is set to 3 prior to shipment from the plant. Reset the channel to 4 in areas where channel 3 is employed for broadcasting.

For this purpose, slide the channel select switch on the rear of the unit to CH 4.

This is YOUR video channel. To view video cassettes, always set the TV channel selector to either channel 3 or 4.

OPERATING THE BUILT-IN TUNER

The HR-D630U incorporates an advanced frequency synthesized tuner which is pretuned to VHF channels 2 through 13, UHF channels 14 through 69 and 113 (excluding 12 VHF broadcasts) cable TV channels* (including mid, super, hyper and ultra bands). There is no need to preset the tuner; it automatically receives the broadcast corresponding to the channel number displayed.

*In Canada: 110 (excluding 12 VHF broadcasts) cable TV channel capability.

Note: If the picture is not clear, perform fine tuning on your television.

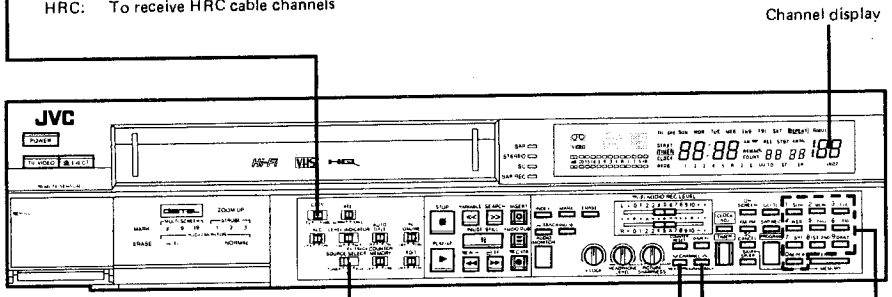
Stored and skipped channels

A total of 181 channels are receivable. However, to prevent the tuner from scanning all the frequencies to reech your desired station, some channels are skipped. It is possible to restore the skipped channels whenever necessary. Also, it is possible to skip more channels if there are no broadcasts on those channels in your area.

Prior to shipment, the following channels are stored for instant tuning.

BAND switch setting	Channels
CATV	VHF 2 through 13 CATV 14, 18, 28, 29, 35, 48, 49
TV	VHF 2 through 13 UHF 14, 15, 17, 18, 20, 22, 23, 25, 27, 29, 30, 32, 35, 35, 40, 44, 48, 49

Band select switch
TV: To receive VHF/UHF channels
CATV: To receive cable TV channels
HRC: To receive HRC cable channels



Scanning channels

Channels can be "called up" in ascending or descending order by using the CHANNEL ∨/∧ buttons on the front control panel. To scan channel numbers which are higher than the channel being received, press and hold the CHANNEL "∧" button. Release when the desired channel is reached. Press and hold the CHANNEL "∨" button to scan lower numbered channels. Release when the desired channel is reached.

Selecting channels

2 To select a channel, simply press the numeric keys. The channel number selected will appear on the display; the channel will change autometically within 2 to 3 seconds after the last numeric key is pressed.

2 To change channels immediately, press the ENTER button after pressing the numeric keys.

Note:
- If an invalid channel is entered, the entered data is cleared and the display returns to the previous number.

Programming favorite channels

Skipping unused channels makes it possible to scan only those channels which are active in your area.

Skipping channels

2 Select the channel you want to skip with numeric keys or up/down tuning.

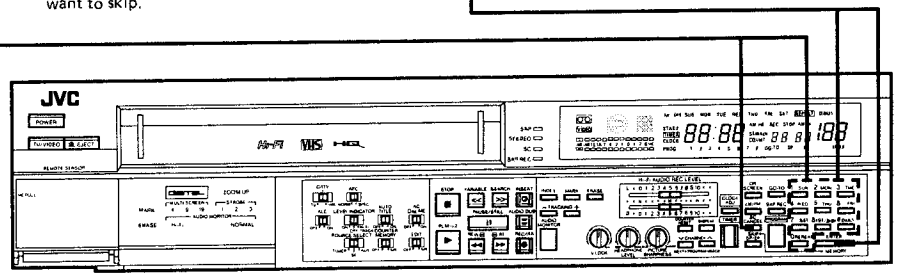
2 Press CANCEL/SKIP.
- The letters "PO" will appear momentarily in place of the channel number, indicating that the corresponding channel has been skipped.
- The channel is now eliminated from the up/down scanning sequence. Repeat for each channel you want to skip.

Storing channels

2 Press the numeric keys to select the channel you want to re-enter.

2 Press ENTER within 2 seconds.
- The channel "entered" will now be available when the channel scanning sequence is used.

Note:
If the recorder is unplugged from the AC outlet, or there has been a power interruption, favorite channel programming will be maintained. There is no need to re-program channels.



Cable (CATV) Channel Reference Chart

The Cable TV (CATV) Channel Reference Chart is supplied for your convenience. Fill in the name or number of the actual station being provided by your CATV company on each CATV channel. (Your CATV company should give you this information.)
If the TV tuner is NOT connected to a CATV antenna system, it is important that the Band Select switch be in the TV position to properly receive VHF channels 2 through 13 and UHF channels 14 through 69.
Note: CATV channels A-1, A-2 & A-8 are not available in Canada.

CATV channel	2	3	4	4a (A-8)	5 (A-7)	6 (A-8)	A-5	A-4	A-3	A-2	A-1	A	B	C	D	E	F	G
Channel number indication	2	3	4	1	5	6	95	96	97	98	99	14	15	16	17	18	19	20
Actual TV station																		
CATV channel	H	I	7	8	9	10	11	12	13	J	K	L	M	N	O	P	Q	R
Channel number indication	21	22	7	8	9	10	11	12	13	23	24	25	26	27	28	29	30	31
Actual TV station																		
CATV channel	S	T	U	V	W	W+1 (AA)	W+2 (BB)	W+3 (CC)	W+4 (DD)	W+5 (EE)	W+6 (FF)	W+7 (GG)	W+8 (HH)	W+9 (II)	W+10 (JJ)	W+11 (KK)	W+12 (LL)	W+13 (MM)
Channel number indication	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Actual TV station																		
CATV channel	W+14 (NN)	W+15 (OO)	W+16 (PP)	W+17 (QQ)	W+18 (RR)	W+19 (SS)	W+20 (TT)	W+21 (UU)	W+22 (VV)	W+23 (WW)	W+24 (XX)	W+25 (YY)	W+26 (ZZ)	W+27 (AAA)	W+28 (BBB)	W+29	W+30	W+31
Channel number indication	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
Actual TV station																		
CATV channel	W+32	W+33	W+34	W+35	W+36	W+37	W+38	W+39	W+40	W+41	W+42	W+43	W+44	W+45	W+46	W+47	W+48	W+49
Channel number indication	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
Actual TV station																		
CATV Channel	W+50	W+51	W+52	W+53	W+54	W+55	W+56	W+57	W+58	W+59	W+60	W+61	W+62	W+63	W+64	W+55	W+68	W+87
Channel number indication	86	87	88	89	90	91	92	93	94	100	101	102	103	104	105	106	107	108
Actual TV station																		
CATV channel	W+68	W+69	W+70	W+71	W+72	W+73	W+74	W+75	W+76	W+77	W+78	W+79	W+80	W+81	W+82	W+83	W+84	
Channel number indication	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	
Actual TV station																		

INFORMATION ON THE HR-D636U'S AUDIO SYSTEM

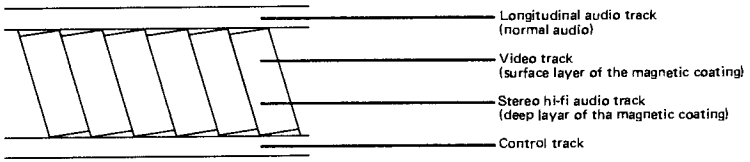
Hi-Fi and normal audio

To provide true hi-fi audio accompaniment to video entertainment and, at the same time, compatibility with regular VHS tapes, the HR-D630U employs a unique audio recording system. Hi-fi audio signals (2-channel) are recorded deep into the tape's magnetic coating, and the video signal is recorded on top of the audio signals in a shallower layer. At the same time, another audio head records normal audio signals (monaural) onto the usual longitudinal audio track. Since this longitudinal audio track is exactly the same as on regular VHS tapes, tapes recorded on the HR-D630U can be played back on other VHS machines, and vice versa.

CAUTION:

- The hi-fi soundtrack recorded with the HR-D630U cannot be reproduced with video equipment other than Hi-Fi VHS.
- Tapes recorded with a conventional stereo video recorder produce monaural sound when played back with the HR-D630U.

Tape pattern recorded with the HR-D630U



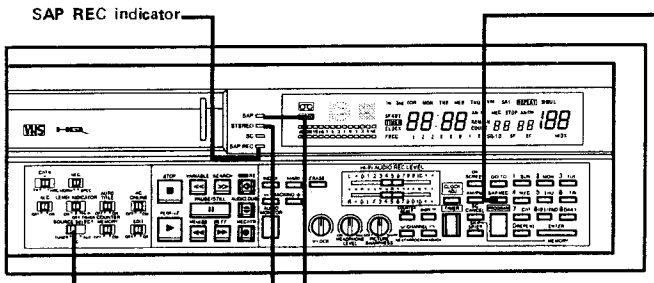
Hi-fi audio recording and reproduction are available only from the hi-fi audio track while the longitudinal audio track provides normal audio.

Tbe hi-fi and normal soundtracks are recorded simultaneously, and audio dubbing is applicable only to tbe normal audio.

MTS (Multichannel Television Sound) compatihility

When stereo and SAP programs are being received, the indicators light to inform you of the type of broadcasts. Then you can select the desired soundtrack for recording with a single switch.

The normal (longitudinal) audio track is monaural. Therefore, stereo programs are recorded in mono on the normal audio track. SAP programs can only be recorded on the normal audio track.



SAP REC button
This button selects the soundtrack to be recorded on the normal audio track when an MTS broadcast is being received and functions only when the SOURCE SELECT switch is set to either TUNER or SC.

- Press to record an SAP soundtrack on the normal audio track. (The main soundtrack, aither mono or stereo, will be recorded on the hi-fi audio track.)
- Release to record a main soundtrack on the normal audio track. Stereo programs will be recorded in mono (L + R mixed) on the normal audio track (and in stereo on the hi-fi audio track).

STEREO indicator
Lights when a stereo program is being received. Stereo programs are always recorded in stereo on the hi-fi audio track.

SAP indicator
Lights when an SAP program is being received. For recording the SAP soundtrack, press the SAP REC button. The SAP REC indicator will light.

If the STEREO and SAP indicators light, it means that a stereo + SAP program is being received. If you want to record both soundtracks, press the SAP REC button. (The SAP REC indicator will light). Then the stereo soundtrack will be recorded on the hi-fi audio track and the SAP soundtrack will be recorded on the normal audio track.

Note:

- Off-air MTS programs are received in accordance with the Broadcast Television Systems Committee (BTSC) standard. The method of transmission of stereo programs via cable varies from area to area and may not be compatible with the BTSC standard. Consult your local cable company for compatibility in your area.

Recording options according to tha settings of the SOURCE SELECT switch

SOURCE SELECT switch position \ Track	Video track	Normal audio track (mono)	Hi-fi audio track (2-channel)
TUNER (SOURCE SELECT: TUNER)	TV picture (from built-in tuner)	**TV sound (from built-in tuner) (Mixing with microphone input is possible.)**	
SC (SOURCE SELECT: SC)	TV picture (from built-in tuner)	TV sound (from built-in tuner)	Audio signal from AUDIO IN (Mixing with microphone input is possible)
AUX (SOURCE SELECT: AUX)	Video signal from VIDEO IN	Audio signal from AUDIO IN (Mixing with microphone input is possible.)	

Notc:

- You can record audio only (without recording any video signal) on the normal and hi-fi audio tracks. This means you can record a continuous 8-hour FM program onto a single cassette (T-160). For this purpose, set the SOURCE SELECT switch to AUX and connect an audio source, such as an FM tuner, to the AUDIO IN connectors. Nothing should be connected to the VIDEO IN connector.

Recording options according to thc typa of broadcasts and the setting of the SAP REC button (indicated hy the SAP REC indicator)

SAP REC button and SAP REC indicator \ Audio track / Type of broadcast		Normal audio track (mono)	Hi-fi audio track (2-channel)	
			L	R
Regular broadcast (monaural audio)	Either position	Mono	Mono	Mono
Regular + SAP (Second audio program)	Released (SAP REC)	Main audio	Main audio (mono)	Main audio (mono)
	Pressed in (SAP REC)	Second audio	Main audio (mono)	Main audio (mono)
Stereo + SAP (Second audio program)	Released	L + R mixed	Stereo	
	Pressed in	Second audio	Stereo	
Stereo broadcast	Either position	L + R mixed	Stereo	

Note:

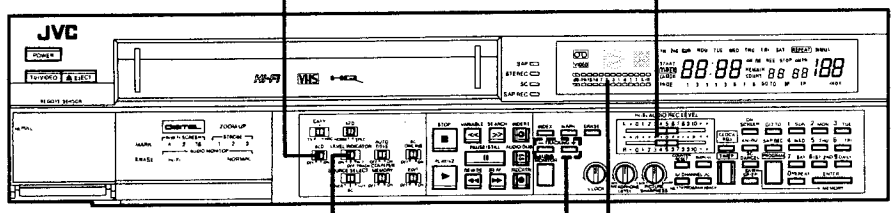
- Second audio programs cannot be recorded on the hi-fi audio track.

Hi-Fi audio recording level adjustment

While recording onto the normal audio track is controlled by the built-in Automatic Level Control (ALC) circuit, hi-fi audio recording has two control options: manual and automatic.

ALC switch
Setting this switch to ON activates the built-in audio limiter circuit for both channels so that the recording level is automatically controlled. For manual adjustment, set this switch to OFF. (The recording level for normal audio is always controlled automatically regardless of the setting of the switch.)

Hi-Fi AUDIO REC LEVEL controls
Slide these controls, the upper for left channel and the lower for right channel, for manual adjustment of the hi-fi audio recording level.

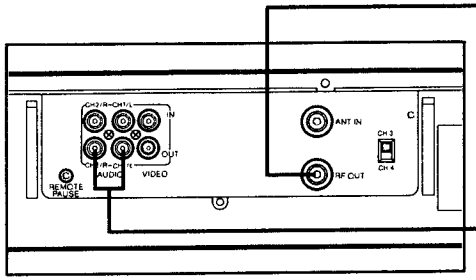


LEVEL INDICATOR switch
For manual control of the recording level, set this switch to ON so that the audio level indicators on the FDP will light.

Audio level indicators
For manual control of the recording level, first set the relevant switches as follows:
ALC → OFF
LEVEL INDICATOR → ON
AUDIO MONITOR → Hi-Fi
Then slide the Hi-Fi AUDIO REC LEVEL controls referring to these indicators. When indicators up to or near 0 dB light for the loudest signal being received, the recording level is optimum. (The level at which only one red indicator lights from time to time may be most appropriate.)
During playback, these indicators show the level of audio signals recorded on the tape and selected with the AUDIO MONITOR button.
If no signal is recorded on the hi-fi audio track, the level of normal audio is automatically indicated.
These indicators do not light when the LEVEL INDICATOR switch is in the OFF position.
Notes:
- With the AUDIO MONITOR select button in the NORMAL position, the recording level of hi-fi audio signals cannot be correctly indicated. Select the Hi-Fi position when adjusting the recording level.
- The normal audio signal level is also displayed by these indicators, but cannot be adjusted.

Dual-audio playback flexibility

Two different types of audio tracks (hi-fi and normal) allow a variety of playback options depending on the connection and the settings of relevant controls and switches.



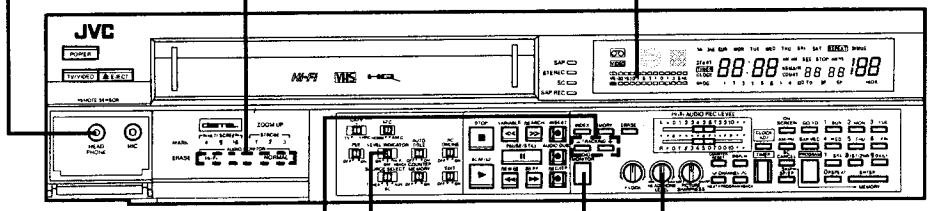
RF OUT connector
Delivers audio and video signals to a TV receiver. When the recorder is not used, the antenna signal is supplied from this connector to the TV receiver to allow regular TV viewing. When a video tape is played back through the RF OUT connector, the audio is reproduced always as monaural; with hi-fi stereo tapes, both channels are mixed or the one selected by the AUDIO MONITOR button is reproduced. Therefore, for stereo playback, connect a stereo system to the AUDIO OUT connectors. Refer to page 12.

AUDIO OUT connectors
Deliver the audio signals from both hi-fi and normal audio tracks.

HEADPHONE jack
Delivers the audio signals from both hi-fi and normal audio tracks. The headphone output level is adjustable with the HEADPHONE LEVEL control.

Audio select indicators (Hi-Fi STEREO/NORMAL)

Audio level/Hi-Fi tracking meter



HEADPHONE LEVEL control

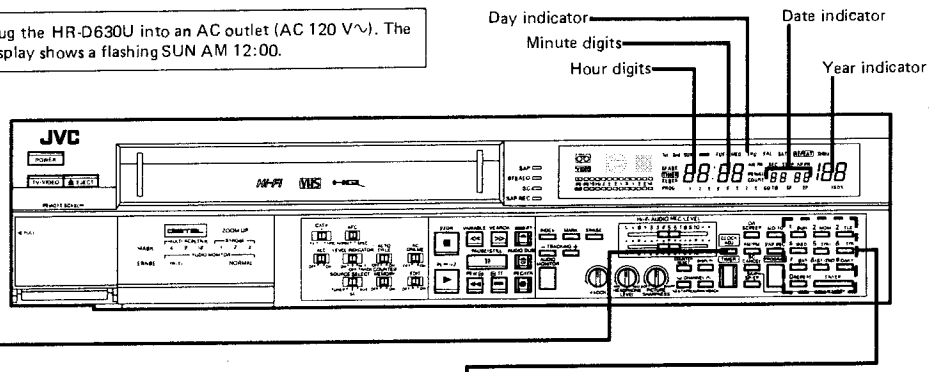
LEVEL INDICATOR switch and TRACKING controls
The audio level indicators on the FDP show the audio signal level during recording and playback when the LEVEL INDICATOR switch is set to ON.
The right-channel audio level indicator also functions as a tracking meter during playback. If noise or breaks are sensed in the reproduced sound from the hi-fi audio track, attempt correction by using the TRACKING controls while referring to the meter. For this purpose, set the LEVEL INDICATOR switch to Hi-Fi TRACK and press either TRACKING control button so that the greatest number of elements of the right-channel indicator light.
When this switch is set to OFF, the indicators do not light; regardless of whether during recording or playback.
Note:
- When playing back a tape with no recording on the hi-fi audio track, tha level indicator doas not light when the LEVEL INDICATOR switch is sct to Hi-Fi TRACK.

AUDIO MONITOR button
Selects the hi-fi stereo soundtrack, the normal soundtrack, or a mixture of the two for listening. Each time the button is pressed, the selected soundtrack changes in the order of hi-fi stereo, normal, mixed, and then back to hi-fi stereo and the corresponding audio select indicator will light. For mixed playback, both the Hi-Fi and NORMAL indicators will light.
- Set to Hi-Fi to listen to a stereo soundtrack.
- Set to NORMAL to listen to the normal sound.
- Set to Hi-Fi/NORMAL to listen to both.

Notes:
- This button functions during recording as well, although it has no effect on the recorded signal.
- When a tape with normal audio only is played back, the NORMAL mode is automatically selected.

CLOCK SETTING

Plug the HR-D630U into an AC outlet (AC 120 V~). The display shows a flashing SUN AM 12:00.



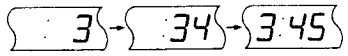
1 Press CLOCK ADJ.
The "CLOCK" indication and the indicated day will flash.

2 Press a numeric key corresponding to the day of the week.
●If the indicated day is OK, proceed to the next step.

3 Press ENTER. The time display section will flash.

4 Press AM/PM to obtain correct indication.
●If the indicated sign is OK, proceed to the next step.

5 Key in the number corresponding to the time to be set.
●Example: To set 3:45, press keys [3] [4] [5] in this order.



6 Press ENTER.
●The month display section of the date indicator will flash.

7 Key in the number corresponding to the month to be set.
Example: To set for December, press keys [1], [2] in succession.

8 Press ENTER.
●The day display section will flash.

9 Key in the number corresponding to the day.

10 Press ENTER.
●The year display section will flash.

11 Key in the number corresponding to the year.
●For 1988, key in only "88".

12 Press CLOCK ADJ at the exact instant of the time signal, and the clock will be set accurately to the present time.

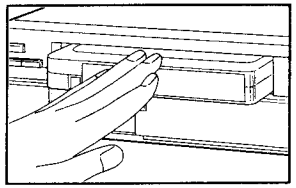
Notes:
- ●Clock setting must begin within 10 seconds of pressing the CLOCK ADJ button, otherwise it will be necessary to press the CLOCK ADJ button again.
- ●Clock setting is not possible if the TIMER button is engaged with the TIMER indicator lit. First check to see that the TIMER indicator is not lit.
- ●Steps 4 and 5 can be reversed.
- ●The NEXT and BACK keys can be used to switch from the day to time setting mode, or vice versa.
- ●Auto-titling (see page 23) will not function unless the time, date and year have been correctly set.
- ●Advance the minute digits slightly ahead of the exact time. Press the CLOCK ADJ button precisely when a time signal from broadcast or telephone is heard to insure accurate time setting.

Power failure indicator
The clock display may reset to SUN AM 12:00 and start to flicker. This is not a malfunctioning of the clock, but it indicates that there has been a power failure in excess of 60 minutes. Readjusting the time restores the normal condition of the clock display.

- If the period of power outage is within about 60 minutes, correct time-keeping continues when power is reapplied.
- During this 60-minute period, the built-in memory back-up capacitor maintains time-keeping and preset timer memory, though the display blacks out.
- The memory baekup capacitor is being recharged when the recorder is not in use. For the fully-discharged capacitor to be recharged sufficiently for 60-minute backup, it takes more than 30 minutes.

LOADING AND UNLOADING A CASSETTE

Loading
Insert a cassette as illustrated with its labelled side facing you.
- With a cassette inserted, the [OO] mark to indicate "cassette inserted" appears on the display panel.



Unloading
Press the EJECT button. The cassette will be ejected.

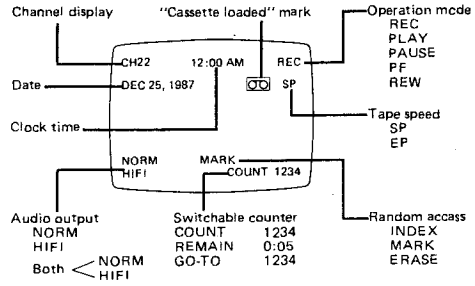
Motorized loading system
- The cassette can be loaded even when the power has not been turned on. Inserting a cassette into the loading slot turns the power on automatically.
- The cassette can be unloaded even when the power has been turned off. If a cassette is inside, pressing the EJECT button turns the power on automatically and, after ejection of the cassette, shuts it off automatically.
- Inserting a cassette, with its safety tab removed, turns the recorder on and playback of the cassette begins automatically.

Notes:
- Be sure to insert the cassette firmly into the slot; otherwise, it will be automatically ejected.
- The automatic loading mechanism will operate only when the cassette is inserted correctly.

Caution
- If unloading of a cassette is not possible, check to see whether the TIMER indicator is lit. If so, press the TIMER button so the TIMER indicator extinguishes.
- Do not attempt to pull out the cassette once automatic loading has started.

Warning
- Do not insert fingers or any foreign object beyond the door flaps of the cassette loading slot, as this could lead to injury or damage to the mechanism. Show special caution with children.

ON-SCREEN CHANNEL, TIME AND MODE DISPLAY



Automatic indication
- Channel
  Each time a different channel is selected, the number of that tuned-in channel is displayed on the TV screen for 5 seconds.
- Operation mode
  Each time the operation mode is changed, that engaged mode is displayed.
  - REC: Displayed for 5 seconds together with channel, "cassette loaded" mark, and the tape speed (SP or EP).
  - PLAY: Displayed only when the mode is changed from Stop to Play. (No indication appears when special effects are applied in the Play mode.)
  - PAUSE: Remains displayed as long as the Record-Pause mode continues.
  - FF/REW: Displayed for 5 seconds.
- "Cassette loaded" mark
  In addition to being displayed together with "REC", the mark is displayed for 5 seconds when a cassette is inserted, and blinks for 5 seconds when the EJECT button is pressed.
- Audio output
  When the audio output is changed by pressing the AUDIO MONITOR button, the engaged audio output mode is displayed for 5 seconds except during playback.
- Switchable counter
  - COUNT/REMAIN: When the counter mode is changed, the same information as on the FDP is displayed for 5 seconds.
  - GO-TO: When the Go-To mode is engaged, the same information as on the FDP appears and, upon completion of Go-To search, disappears after showing the last figure for 5 seconds.
- Random access
  - INDEX: Displayed when the Index Search mode is engaged. When the search number is specified by the numeric keys, this is also displayed until search spooling is initiated.
  - MARK: Displayed when an index code is recorded (whether automatically or manually).
  - ERASE: Displayed when the ERASE button is pressed.

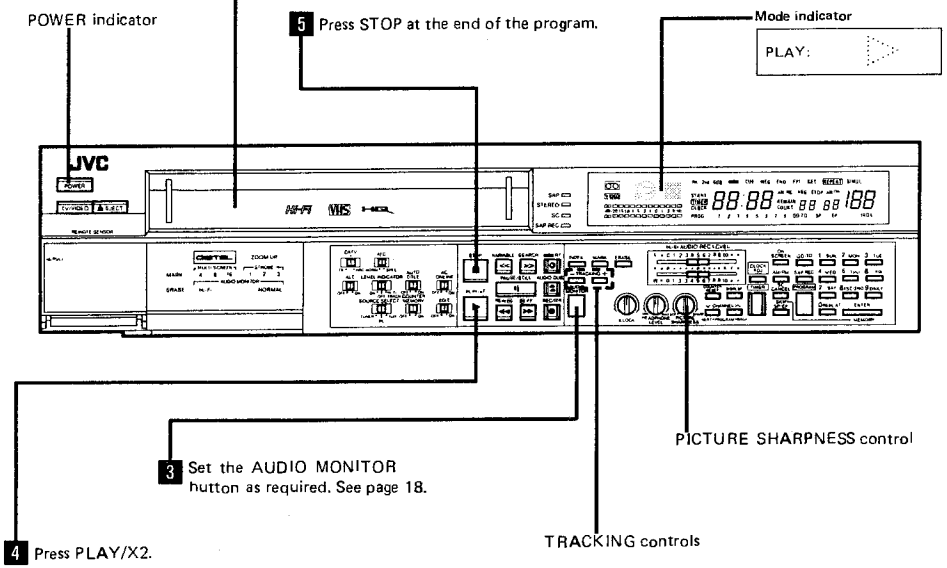
Manual recall/cancel
- For anytime checking of the recorder status, or time and date, press the ENTER button (on the recorder or remote control) or the ON SCREEN button (on the remote control). The corresponding indication will be available on the screen for 5 seconds.

Note:
- For on-screen timer programming, see pages 34 and 35.

PLAYING BACK A VIDEO CASSETTE

1 Switch ON.
Adjust the TV receiver's channel to the video channel (3 or 4).

2 Load a pre-recorded cassette. Power will be switched on automatically. When the cassette loaded has no safety tab, playback starts automatically.


POWER indicator
5 Press STOP at the end of the program.
Mode indicator
PLAY:
PICTURE SHARPNESS control
3 Set the AUDIO MONITOR button as required. See page 18.
TRACKING controls
4 Press PLAY/X2.

Notes:

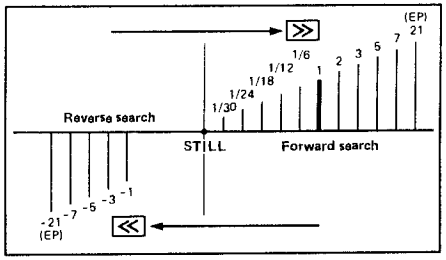
- The SP/EP button may be in either position. The SP, LP or EP mode recording is automatically detected and played back at the correct speed.
- When the PLAY/X2 button is pressed to start playback, the VIDEO mode is automatically entered and the VIDEO indicator on the FDP lights.
- The tape-end auto rewind mechanism functions in both the Play and Fast Forward modes.
- Noise bars may appear on the screen if you play back a tape which was recorded using another recorder. In such cases, adjust the TRACKING controls. Press one of the buttons until a satisfactory picture is obtained. After playback, tracking may be reset manuelly by pressing both buttons simultaneously. It is reset automatically when the tape is ejected or the power turned off.
- Images on the screen can be adjusted to a preferred softer or sharper definition by turning the PICTURE SHARPNESS control.
- When listening through headphones, if the volume is too low or too high, adjust the HEADPHONE LEVEL control for comfortable listening.

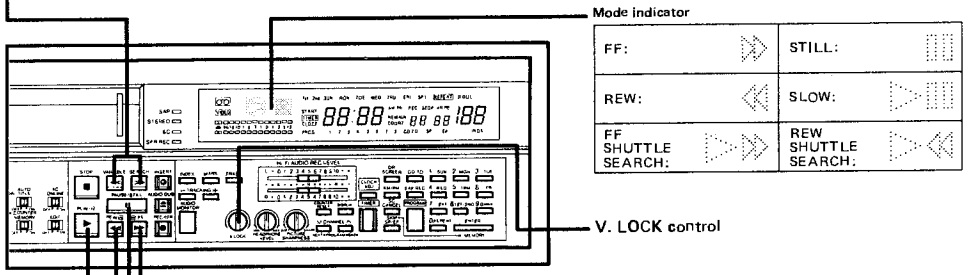
SPECIAL-EFFECTS PLAYBACK

When one of the following modes is engaged, the digital circuitry is automatically activated to help compensete for picture quality deterioration. Therefore, stills, slow-motion and fast-motion pictures are all cleaner than before. The "DIGITAL" indicator will remain lit while in these modes.

VARIABLE SEARCH buttons

- To search in the forward direction, press the ≫ button in the Play mode; slow-motion playback at 1/30 the normal speed is engaged.
  To increase the speed (to 1/24, 1/18, 1/12, 1/6, normal, 2X, 3X, 5X and 7X), press the ≫ button; to decrease the speed, press the ≪ button. Pressing the ≪ button from 1/30, the direction changes to reverse search.
- To search in the reverse direction, press the ≪ button in the Play mode. Reverse playback at normal speed is engaged.
  To increase the speed, press the ≪ button; to decrease the speed, press the ≫ button. Pressing this ≫ button from normal speed changes the direction to forward search.





High-speed reverse search
REW button

- To rewind the tape, press this button in the Stop mode.
- To shuttle search the tape in the reverse direction, press this button in the Play mode.
- The shuttling speed is about 7 times normal in the SP mode and 21 times normal in the EP mode.
- Press the PLAY/X2 button to return to normal playback.

High-speed forward search
FF button

- To fast forward the tape, press this button in the Stop mode.
- To shuttle search the tape in the forward direction, press this button in the Play mode.
- The shuttling speed is about 7 times normal in the SP mode and 21 times normal in the EP mode.
- Press the PLAY/X2 button to return to normal playback.

Double-speed playback
PLAY/X2 button

- Press while in the Play mode; double-speed playback will be engaged.
- To resume normal playback, press the same button again.

Still playback
PAUSE/STILL button

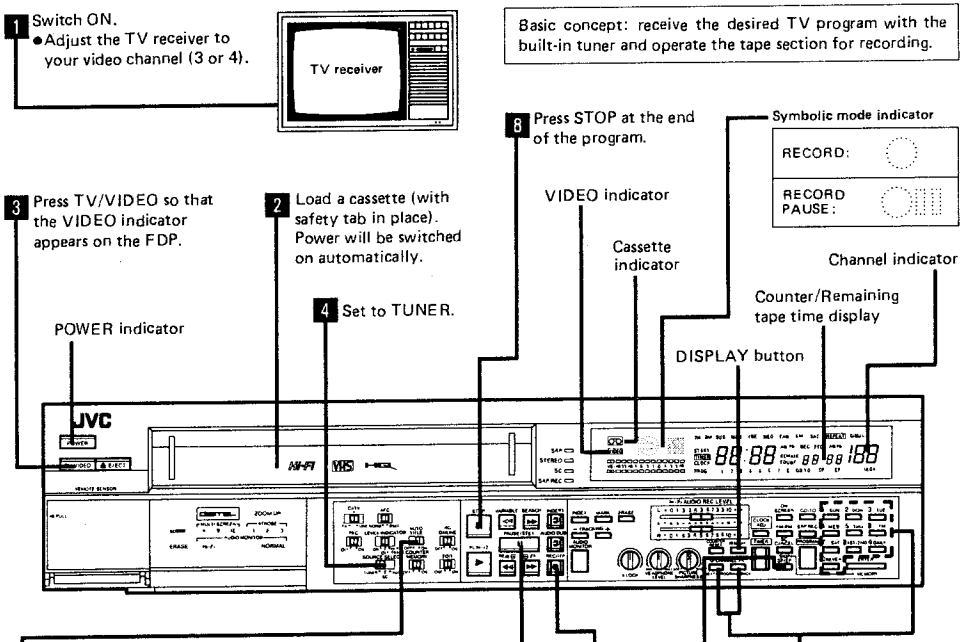
- Press while in the Play mode; the tape will stop and a still picture will be obtained.
- To advance the still picture, press again.
- To return to the normal Play mode, press the PLAY/X2 button.

Notes:

- For briefer scanning, keep the REW or FF button pressed for more than 2 seconds; when you release the button, the Search mode will be cancelled. In this case, the shuttling speed in the EP mode is about 7 times normal.
- When the Still mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.
- With some televisions, the still picture may be unstable. If vertical vibration of the picture is observed, attempt to correct it by turning the V.LOCK control.
- If noise bars are visible, use the TRACKING controls as described on the previous page.
- With some video cassettes, the TV picture may distort during slow-motion playback. This is not due to any defect of the unit.
- Special-effects playback is not possible in the LP mode. When the Special-effects mode is engaged during playback of LP recorded tapes, the picture disappears from the screen. If you happen to engage one of the Special-effects modes while playing an LP tape, simply press the PLAY/X2 button to restore the picture.

BASIC OPERATION FOR RECORDING TV PROGRAMS

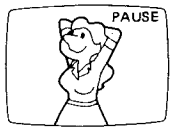
Basic concept: receive the desired TV program with the built-in tuner and operate the tape section for recording.


1 Switch ON.
●Adjust the TV receiver to your video channel (3 or 4).
TV receiver
8 Press STOP at the end of the program.
Symbolic mode indicator
RECORD:
RECORD PAUSE:
3 Press TV/VIDEO so that the VIDEO indicator appears on the FDP.
2 Load a cassette (with safety tab in place). Power will be switched on automatically.
VIDEO indicator
Cassette indicator
Channel indicator
Counter/Remaining tape time display
POWER indicator
4 Set to TUNER.
DISPLAY button
JVC

AUTO TITLE switch
If you wish the recording data to be recorded at the beginning of a program, set the AUTO TITLE switch to ON. Each time recording is initiated from the Stop or Timer Standby mode, the channel, time and date will be recorded for about 5 seconds.

The recording data can also be recorded by pressing the MARK button during recording (with the AUTO TITLE switch set to ON). If you wish this recording to be performed when starting a recording from the Record-Pause mode, press the MARK button in the Record-Pause mode and then start recording by pressing the PLAY button.

PAUSE/STILL button



On-screen Pause Mode indicator

6 Select the channel you wish to record.

5 Select the recording speed (SP or EP).
SP: 2 hours 40 minutes with a T-160 cassette.
EP: 8 hours with a T-160 cassette.

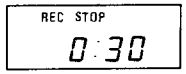
7 Press REC/ITR once to start recording. (When using the remote control unit, press the REC and PLAY/X2 buttons simultaneously.)

Notes:
- If the REC/ITR button is pressed more than once, the Instant Timer Recording mode will be entered (see page 24). To return to ordinary recording, repeatedly press the REC/ITR button until the REC STOP indicator in the FDP is extinguished.
- If there is part of the program you don't want to record, press the PAUSE/STILL button. To release the Pause mode, press the PLAY/X2 button.
- When recording is restarted from the Pause mode, assemble recording is performed so that the playback picture will not distort at the edit point. A few frames recorded before the pause are erased due to overlap of the new recording. This is not due to any defect of the unit.
- When the end of the tape is reached during recording, the tape is automatically rewound to the beginning and stops.
- Press the DISPLAY button to check how much recording time is left.
- The built-in tuner's automatic channel lock mechanism prevents the selected channel from being altered during recording. Therefore, if you wish to change the channel during recording, first engage the Pause mode and then select a different channel.

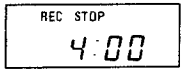
INSTANT TIMER RECORDING

After you start recording, the recorder can be set to stop automatically after a certain period of time. Use this facility for starting a recording before you go to bed or leave home.

2 Press REC/ITR while recording (or twice if in the Stop mode).
●The following indication will appear on the display, to show that the recorder is recording in the Instant Timer Recording mode and power will switch off after 30 minutes.



2 Each time the REC/ITR button is pressed, recording time increases by 30 minutes to a maximum of 4 hours. If the REC/ITR button is pressed again, the Normal Recording mode will be entered.



- For a more precise time setting, use the numeric keys to set to the exact time required.

1. After "0:30" has appeared, specify the time using the numeric keys.
   ●Always key in a full number including hours and minutes.
2. Press the REC/ITR button immediately (within 4 seconds).

Notes:
- Time setting in the Instant Timer Recording mode is possible up to a maximum of 8 hours 59 minutes if the numeric keys are used.
- While recording is in progress, the displayed time counts down; when 0:00 is reached, the Record mode is released after 10 seconds and the power is switched off.
- If you want to stop recording after having started recording in the Instant Timer Recording mode, press the STOP button.
- If instant timer recording is engaged while the unit is in the Pause mode, the timer will count down normally, but recording will not begin until the PLAY/X2 button is pressed.
- When the Instant Timer Record-Pause mode continues for longer than about 5 minutes, the mode is released and the power is switched off.
- If you want to check the Remaining tape time or Counter reading while performing instant timer recording, press the DISPLAY button to obtain the desired indication (the REC STOP indication disappears). To return to the REC STOP indication, press the REC/ITR button once, or wait for about 5 seconds and the remaining time indication will reappear automatically.

RECORDING ONE TV PROGRAM WHILE WATCHING ANOTHER

A program not being viewed can be recorded while you enjoy another program. This permits the recorded program to be played back later at your convenience.
The recording procedure is exactly the same as described on the previous page. The points to be remembered are:
- Select the channel you wish to record with the recorder's channel select buttons.
- Select the channel you wish to view with the TV receiver's channel selector.
- Make sure that the VIDEO indicator is not lit on the FDP. If lit, press the TV/VIDEO button so that it extinguishes.

RECORDING STEREO TV PROGRAMS

When stereo TV programs are broadcast, the HR-D630U is capable of automatically receiving them in stereo. When a stereo program is being received, the STEREO indicator lights and recording is made in stereo on the hi-fi audio track and in monaural on the normal audio track. To listen to the stereo soundtrack during recording, set the AUDIO MONITOR select button to Hi-Fi (the Hi-Fi indicator lights).

RECORDING SAP (Second Audio Program) TV PROGRAMS

When an SAP TV program is being received, the SAP indicator lights. To record such a program, pay attention to two additional controls and the basic operation described on the previous page.
- Press the SAP REC button so that the SAP REC indicator lights, to record the second audio program. To record the main audio program only, release this button (the SAP REC indicator is off).
- Set the AUDIO MONITOR select button to NORMAL (the NORMAL indicator lights) to listen to the SAP soundtrack being recorded.

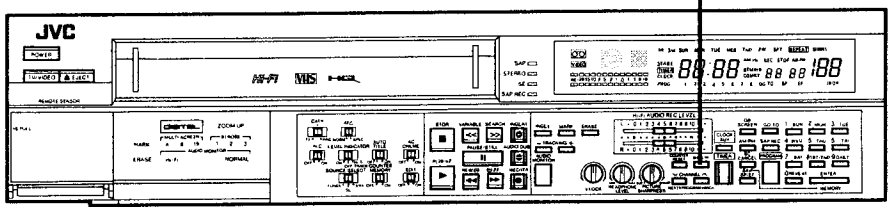
Note:
- SAP programs can be recorded only on the normal audio track. It is not possible to record any SAP program on the hi-fi audio track, regardless of the setting of any switch.

REMAINING TAPE TIME INDICATOR

The tape counter is switchable to the remaining tape time indicator.

1 Press the DISPLAY button to obtain the Remain mode.

2 The remaining tape length will be shown in hours and minutes.



Notes:
- During recording, the remaining tape length is calculated in reference to the recording mode selected by the SP/EP button; during playback, it is calculated in reference to the recording mode of the tape being played (SP/EP).
- The indicated remaining time is approximate. The time required to calculate the remaining tape length and the accuracy of that calculation may vary according to the type of cassette tape. (The remaining time indication is not available if this mode is engaged from Fast Forward or Rewind.)

NEXT-FUNCTION MEMORY

Memory Play function
- If you want to watch the tape from its beginning after rewinding, press the REW button and than PLAY/X2 within 2 seconds. Playback will start automatically at the beginning of the tape. (The COUNTER MEMORY switch must be in the OFF position.)
- If you want to watch the tape from the counter reading of "0000", press the COUNTER MEMORY switch to the ON position. Then press the REW (or FF) button and then PLAY/X2 within 2 seconds.
- While the tape is being rewound, the PLAY indicator is blinking. To cancel the Memory Play mode and go to another mode, press the corresponding button (STOP, PLAY/X2, FF, REW).

Memory Eject/Power-Off/Timer Standby

If you are going to eject the cassette, turn the power off or engage the Timer Standby mode after rewinding the tape, you don't have to wait for completion of rewind to press the corresponding button.
- To eject the cassette after rewind, press REW and then EJECT within 2 seconds. (To cancel the Memory Eject mode, press STOP.)
- To turn the power off after rewind press REW and then POWER within 2 seconds. (To cancel the Memory Power-off mode, press POWER.)
- To engage the Timer Standby mode after rewind, press REW and then TIMER within 2 seconds. (To cancel the Memory Timer Standby mode, press TIMER.)

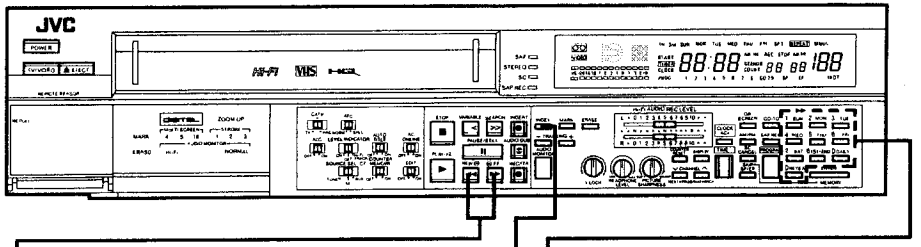
Memory Play	REW/FF	PLAY/X2	PLAY	Blinking	Play mode
Memory Eject	REW	EJECT		Blinking	Cassette ejected
Memory Power-off	REW	POWER	POWER	Blinking	Power off
Memory Timer Standby	REW	TIMER	TIMER	Lights	Timer standby mode

within 2 seconds

INDEX SEARCH FUNCTION

The Index Search function gives you automatic access to the beginning of individual recordings, and to index codes placed by you within those recordings. With the HR-D630U, you can access any one of up to 9 of these indexed segments in either the forwerd or reverse direction.

Using the Index Search function



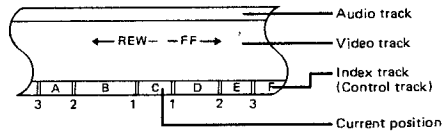
1 Press the INDEX button (on the recorder or remote control) while in the Play or Stop mode.
- The channel display of the FDP will change to the Index Search mode.

2 Specify the index number using one of the numeric keys.
- The specified number will appear in the FDP.

3 Press either FF or REW within 2 seconds.
- The tape will move and the index numbers count down to 0, where normal playback will start.
- If the INDEX button was pressed in the Play mode, the screen shows search pictures; if the button was pressed in the Stop mode, the index codes are detected in the Rewind or Fast-Forward mode.

Notes:
- To cancel the Index Search mode before completion, press the PLAY/X2 or STOP button.
- If the end of the tape is reached while still in the Index Search mode, the mode is cancelled and the tape rewound.

Tips for specifying the index numher

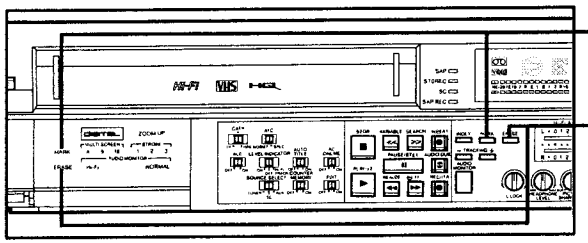


- "1" + FF moves playback to the beginning of segment D.
- "1" + REW moves playback to the beginning of segment C.
- "2" + REW moves playback to the beginning of segment B.
- If no number is entered, a value of "1" is assumed.

Changing the index codes

Index codes are automatically placed at the beginning of recordings which are started from the Stop or Timer mode.

You can use the MARK button to add extra codes, and the ERASE button to erase codes. In neither case is there any effect on the audio or video recordings on the tape.



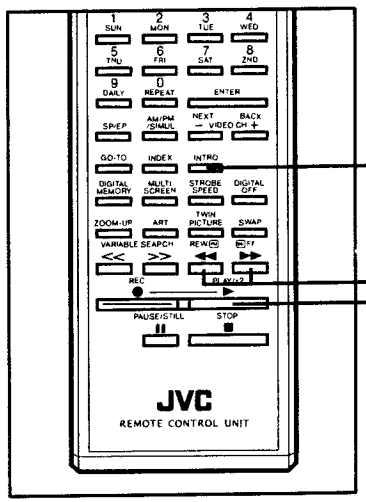
MARK
In the Play or Record mode, press this button once to put an index code onto the tape.
The LED blinks during the marking process.

ERASE
In the Play or Still mode, press this button to erase the next index code. First the Shuttle Search mode will be engaged and, when an index code is detected, it will be erased automatically. Then the Erase mode is cancelled and playback resumes.
The LED remains lit during the searching process and blinks during the erasing process.

Notes:
- If the AUTO TITLE switch is set to ON, both the index code and the recording data will be recorded by pressing the MARK button.
- The index codes on a tape with its safety tab removed cannot be changed.
- While the index code is being searched for in the Erase mode, random noise appears on the screen.
- Changing the index codes in the vicinity of switching points between SP and EP recordings will distort the pictures.

INTRO SEARCH FUNCTION

The Intro Search function lets you visually check the contents of each recording by playing back in fast motion a short segment of a program each time an index code is detected.

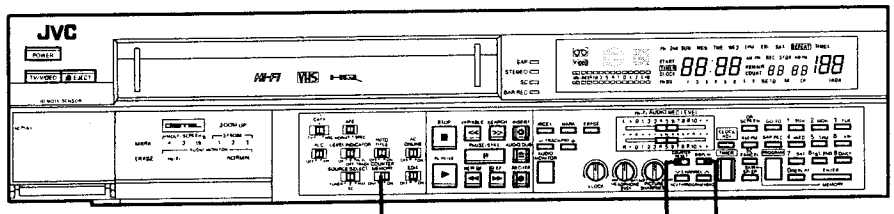


1 Press the INTRO button while in the Play or Stop mode.
- The INDEX indicator on the FDP will light.

2 Press the FF or REW button within 2 seconds.
- The Intro Search will start in the corresponding direction.
- Each time an index code is detected, the corresponding part is played back at the search speed (7 times normal in SP and 21 times normal in EP mode) for about 5 seconds.

3 When you find the section you want to view, simply press the PLAY/X2 button.
- Normal playback will start.

COUNTER MEMORY FUNCTION



Counter Memory function

1. Press the DISPLAY button to obtain the Counter mode.
2. Press the COUNTER RESET button at a point which you may wish to locate later.
   - The tape counter will indicate "0000".
3. Set the COUNTER MEMORY switch to ON.
4. Press the REW (or FF) button when you need to return to the designated point.
   Tha tape will rewind (or fast forward) and stop at about the "0000" counter reading automatically.

DISPLAY button
When the POWER button is pressed, or a cassette is inserted, the tape counter appears on the display with the COUNT indicator illuminated. To check the length of tape left, press the DISPLAY button to engage the Remaining Time mode. (See page 25.)

COUNTER RESET button
Press to reset the tape counter to "0000".

Note:
Unless the COUNTER RESET button is pressed, or a cassette leader tape detected (see page 28), the count is maintained even after the POWER button is pressed to off (as long as the unit is plugged into an AC outlet).

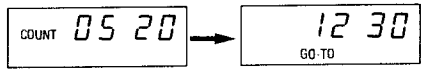
COUNTER GO-TO FUNCTION

The counter Go-To function gives you direct access to any point on the tape by simply specifiying a desired counter reading. Depending on your command, the tape will either stop at the point or playback will start automatically from there.

2 Press the GO-TO button.
- The counter will change to the Go-To mode.

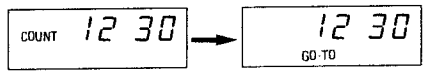
There are three possible cases:

(1) Counter reading changes from one number to another.



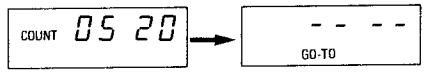
Relative count — Absolute count

(2) Counter reading remains unchanged.



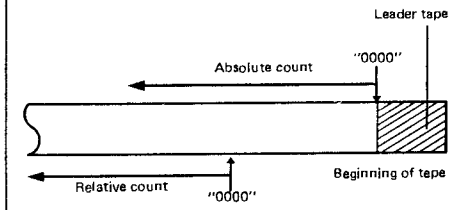
Absolute count — Absolute count

(3) "----" appears instead of a numher.



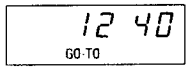
- The recorder did not detect the leader tape when the cassette was loaded and, therefore, cannot determine the tape's present position in relation to its beginning.

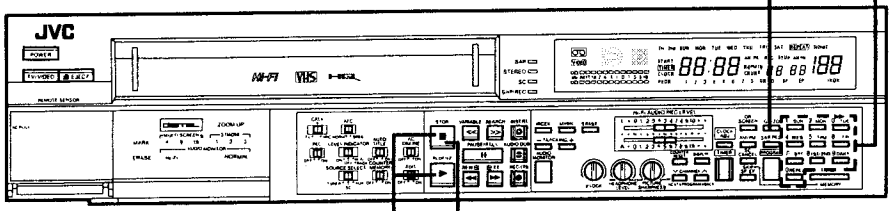
Absolute count vs. Relative count



- The absolute "0000" count is automatically set when the leader tape is detected at the time of cassette loading.
- The relative "0000" count is set when the COUNTER RESET button is pressed, and does not apply to the counter Go-To procedure.

3 Specify the point you want to locate by using the 10 numeric keys.





1 Engage the Stop mode.

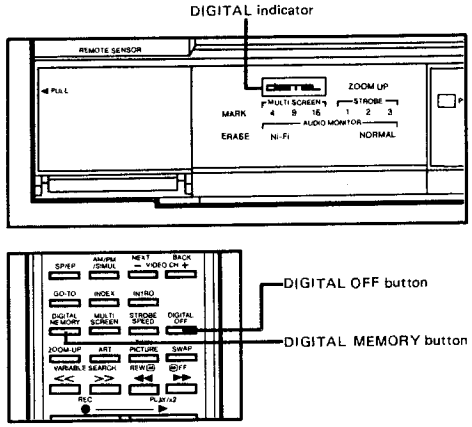
4 Press the PLAY/X2 or STOP button.
- In cases (1) and (2), the tape will either fast forward or rewind to the specified point.
- In the case of (3), the tape is first rewound to the beginning of the tape (where the counter is automatically reset to "0000") and then is fast forwarded to the specified point.
- Once the beginning of the tape is detected in this way, the tape counter always reads the position in relation to the beginning until the COUNTER RESET button is pressed at a different position.

- If the specified number exceeds the tape length, the tape is first fast forwarded to its end, then rewound to its beginning and stops.
- Use of the Go-To function cancels the previous relative count.
- Press the PLAY/X2 or STOP button to cancel the Go-To function and enter the Play or Stop mode.

DIGITAL FUNCTIONS

The HR-D630U incorporates digital memory circuits to provide a variety of special effects during recording, and while watching a recorded tape or a regular television broadcast.

DIGITAL FREEZE FUNCTION



Note:
To use the HR-D630U as a special-effects generator while watching television, engage the HR-D630U in the VIDEO mode, set the TV receiver to your video channel and select the channel you wish to view with the HR-D630U's channel selector.

Digital Freeza:

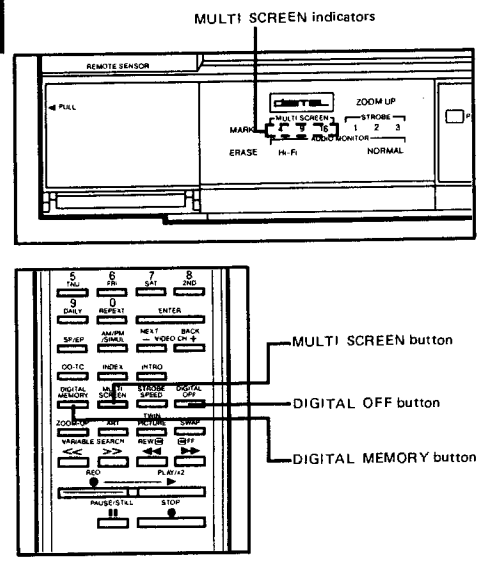
A still picture stored in memory is continuously reproduced on the TV screen while the tape runs or a regular broadcast continues. The soundtrack is not affected. If this mode is engaged during recording, the frozen picture will be continuously recorded.

1. While in the Play or Record mode (or while viewing a television program), press the DIGITAL MEMORY button.
   - The picture is "frozen" on the screen at the instant of pressing.
   - The soundtrack continues unaffected.
   - The "DIGITAL" indicator will light.
2. To switch to another still picture, press the DIGITAL MEMORY button again.
3. To restore normal pictures, press the DIGITAL OFF button.

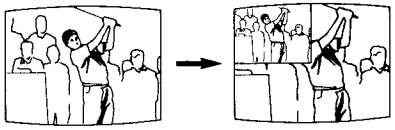
MULTI-SCREEN DIGITAL FREEZE FUNCTION

Multi-Screen Digital Freeze:

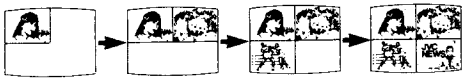
Selected still pictures are displayed on split screens.



1. While in the Play or Record mode (or while viewing a television program), press the MULTI SCREEN button to select the desired Multi Screen mode.
   - The first pressing engages the 4-screen mode, then each subsequent pressing changes the number of sub-screens to 9 and 16. Pressing once again cancels the Multi-Screen mode.
   - The corresponding MULTI SCREEN indicator will light.
2. Press the DIGITAL MEMORY button.
   - The picture will be frozen and the ongoing program will continue in a sub-screen appearing in the upper left corner.
   - The "DIGITAL" indicator will light.



3. Each time the DIGITAL MEMORY button is pressed, still pictures will fill the subsequent sub-screens.
   - When the last sub-screen is frozen by pressing the DIGITAL MEMORY button, the program will continue in the first sub-screen and another cycle of selecting still pictures for each of the sub-screens can be performed.



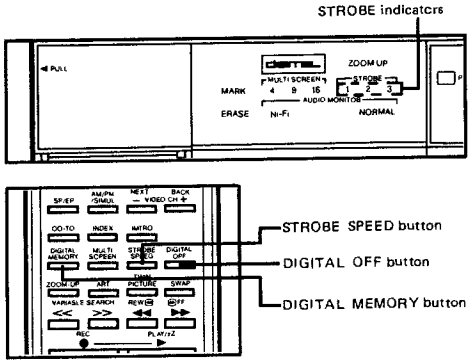
4. To restore normal pictures, press the DIGITAL OFF button.

Note:
- The images on the screen will become distorted if you change the channel while remaining in the Multi-Screen Digital Freeze mode.

DIGITAL STROBE FUNCTION

Digital Strobe:

A still picture selected at regular intervals from the tape or broadcast and stored in memory is continuously reproduced on the screen while the tape or broadcast continues with its soundtrack unaffected. The regular changing of the stored picture results in a strobe-light or time-lapse effect. Strobing at three different speeds can be selected. When applied during recording, the strobing pictures will be recorded.



1. While in the Play or Record mode (or while watching a television program), press the STROBE SPEED button to select the desired speed.
   - Each time the STROBE SPEED button is pressed, the speed becomes faster in the order of 1, 2, 3, then Freeze and then returns to 1.

Strobe Speed

Indication	Strobing interval
STROBE 1	Approx. 0.6 sec
2	Approx. 0.3 sec
3	Approx. 0.1 sec

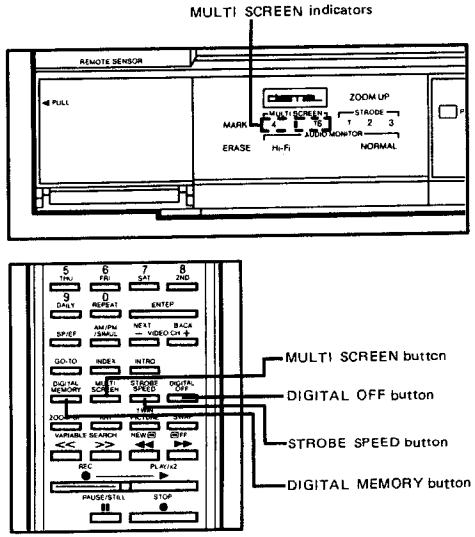
   - The selected speed will be indicated by one of the STROBE indicators.
   - After speed 3, a still picture is maintained as in the Digital Freeze mode.
2. Press the DIGITAL MEMORY button while in the Play mode (or while watching a television program).
   - Strobing will start at the selected speed.
   - The "DIGITAL" indicator will light.
   - To change the strobe speed, press the STROBE SPEED button the required number of times.
3. To restore normal pictures, press the DIGITAL OFF button.

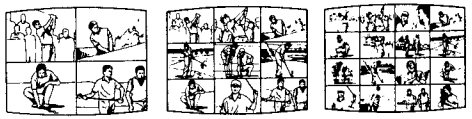
Note:
- It is also possible to perform strobing by first engaging the Digital Freeze mode and then selecting the speed.

MULTI-SCREEN DIGITAL STROBE FUNCTION

Multi-Screen Digital Strobe:

Still pictures are displayed on sub-screens successively at the selected strobe speed.



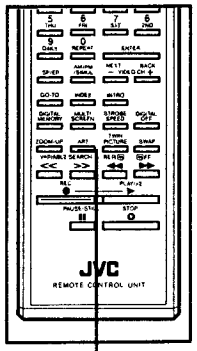


1. While in the Play or Record mode (or while watching a television program), press the MULTI SCREEN button to select the desired Multi Screen mode.
   - The corresponding MULTI SCREEN indicator (4, 9 or 16) will light.
2. Press the STROBE SPEED button.
3. Press the DIGITAL MEMORY button.
   - The still picture coinciding with the pressing of the button will be displayed on sub-screens and those sub-screens will be filled with different still pictures automatically at a constant speed.
   - The "DIGITAL" indicator will light.
   - After all sub-screens have been filled with still pictures, the screen remains unchanged.
4. To restart strobing, press the DIGITAL MEMORY button; the pressing changes the picture on the first (upper left-corner) sub-screen into a normal moving picture, and start strobing.
5. To restore normal pictures, press the DIGITAL OFF button.

Notes:
- Once the DIGITAL MEMORY button has been pressed, it is not possible to alter the number of screens.
- The images on the screen will become distorted if you change the channel in the middle of strobing. To change the channel, first cancel the digital mode by pressing the DIGITAL OFF button.

DIGITAL FUNCTIONS

DIGITAL ART EFFECTS

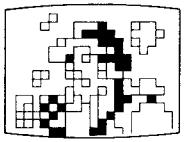


ART button

Mosaic effects:
Reproduces the image with square patterns. Two different patterns are available.

Mosaic 1
A pattern of smaller squares

Mosaic 2
A pattern of larger squares



Solarization effects:
Solarizes the color of the image as with a paint-brush.

Solarization 1
Strongar solarization

Solarization 2
Weakar solarization

1 Press the ART button while in the Play mode (or while watching a television program).
- Each time the ART button is pressed, the mode changes in the order of Mosaic 1, 2, Solarization 1, 2 and then returns to Mosaic 1.
- The "DIGITAL" indicator will light.

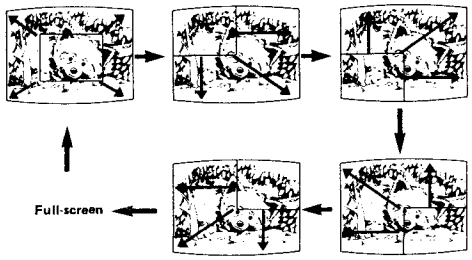
1 Press the DIGITAL OFF button to restore normal pictures.

Note:
- The Digital Art function can also be used in combination with the following functions:
  - Digital Freeze
  - Digital Strobe

DIGITAL ZOOM FUNCTION

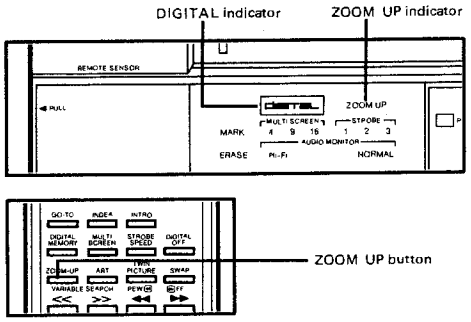
Digital Zoom:
Enlarges the desired quarter of the picture on the screen to a full-screen picture. The displayed pictures are moving pictures.

1 Press the ZOOM UP button while in the Play mode (or while viewing a television program).
- The center quarter of the picture will be enlarged to full-screen size.
- Each time the ZOOM UP button is pressed, the position of the quarter to be enlarged changes in the order as shown below:



- While in the Digital Zoom mode, the ZOOM UP and DIGITAL indicators remain lit.

1 To restore normal pictures, press the DIGITAL OFF button.

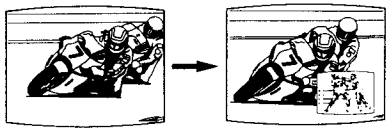


Notes:
- In the Digital Zoom mode, the picture may become slightly more grainy or it may look split into upper and lower halves.
- With some televisions, the zoomed-up picture may not completely fill the entire screen. This is not due to any defect of the unit.

PICTURE-IN-PICTURE AND SWAP FUNCTIONS

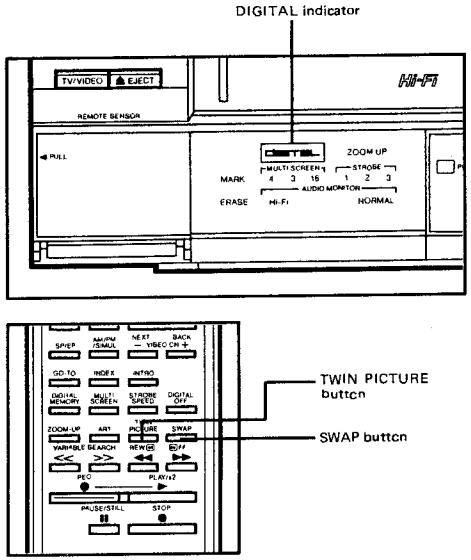
Picture-In-Picture:
During tape playback, a TV broadcast received by the VCR's built-in tuner is displayed in an inset window.

1 While in the Play mode, press the TWIN PICTURE button.
- A sub-screen corresponding to the size of the 9-screen mode will appear in the lower right-hand corner and show a program from the selected channel of the VCR's tuner.



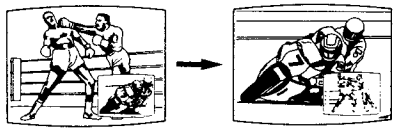
- The "DIGITAL" indicator will light.
- Each pressing of the TWIN PICTURE button shifts the position of the window as follows:

- To view another program in the window, select a different channel on the VCR.
- If an external source is sclected, this can be displayed as well.



Swap function:
The swap function allows the switching of pictures between the main screen and window.

1 To switch pictures between the main screen and window, press the SWAP button.



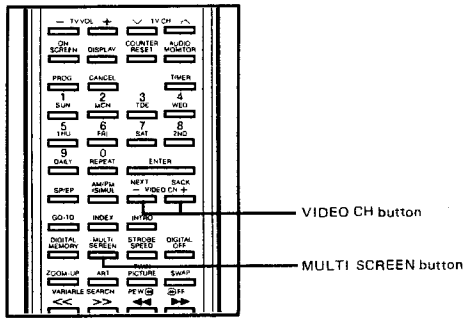
1 To restore normal playback pictures, press the DIGITAL OFF button.

Notes:
- With some televisions, the position of the window could be such that its edge exceeds the frame of the main screen.
- If the reception quality of the TV program on the main screen is inferior, the picture in the window may not be normal.
- If the program on the main screen is monochrome, the picture in the window will also be monochrome.

MULTI-SCREEN CHANNEL SCAN FUNCTION

Multi-Screen Channel Scan:

Broadcast programs are displayed as still pictures on sub-screens as channel scanning proceeds. This multi-screen picture cannot be recorded.



- Press the MULTI SCREEN button to sclect the desired Multi-Screen mode.
- With the TV program displayed on the screen, press the VIDEO CH "-" or "+" button to scan channels; "-" to scan channels lower than the currently tuned-in and "+" to scan channels higher than the currently tuned-in.
  - The "DIGITAL" indicator will light.
  - The sub-screens will be filled sequentially with still pictures of tuned-in channels.
  - After ell sub-screens have been filled with still pictures, the screen remains unchanged.
  - To continue scanning, press the VIDEO CH "-" or "+" button.
- To cancel the Multi-Screen Channel Scan mode, press the DIGITAL OFF button.

MULTI-SCREEN INTRO SEARCH FUNCTION

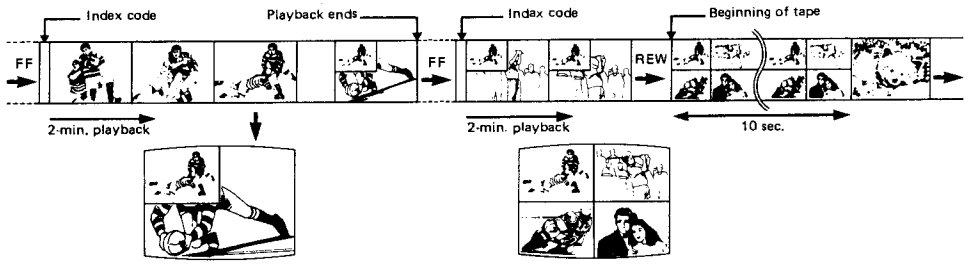
Multi-Screen Intro Search:

Using the Multi Screen mode and the Index Search function, displays the still pictures located at detected index codes and, after completion of the search, records the multi-screen image at the beginning of the tape.

- Press the MULTI SCREEN button to select the desired Multi Screen mode (4, 9 or 16).
  - Always start Intro Search from the beginning of the tape.
- Press the INTRO button.
- Press the FF button
  - When an index code is detected, playback starts automatically and continues for about 2 minutes.
  - Intro Search in the reverse direction is not possible.
- Press the DIGITAL MEMORY button while playback continues.
  - The picture coinciding with the pressing of the button is displayed on the upper left-hand corner sub-screen.
  - If the DIGITAL MEMORY button is not pressed, the last picture of the 2-minute playback remains displayed on the sub-screen as a still picture.
  - Then the Fast-Forward mode is automatically engaged to detect the next index code.
  - The "DIGITAL" indicator will light.
- When all sub-screens have been filled with still pictures or the end of the tape is reached, the Rewind mode is engaged (Auto Rewind).
- When the tape is rewound to the beginning, the multi-screen picture is automatically recorded at the beginning of the tape for about 10 seconds.
  - If the safety tab of the cassette has been removed, this recording will not take place.
- The VCR enters the Stop mode automatically and the Digital function is also cancelled.

Notes:

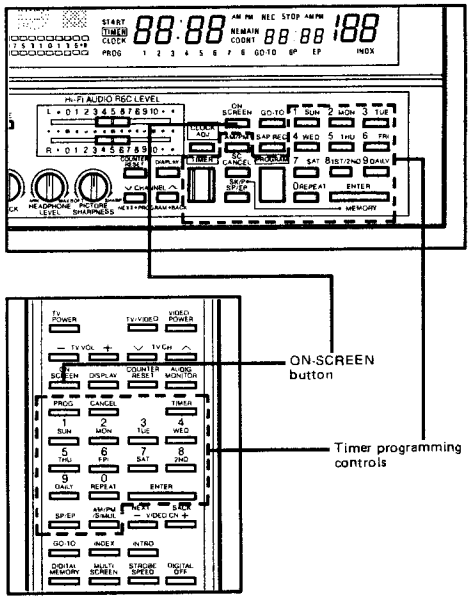
- To cancel the Intro Search mode midway, press the DIGITAL OFF button or STOP button.
- The recorded program at the beginning of the tape will be replaced for about 10 seconds by the multi-screen picture by automatic recording. (This recording will not take place if there are no index codes on the tape.)
- Programs between index codes less than 2 minutes away from each other will not be memorized automatically.



TIMER RECORDING

AUTOMATIC TIMER RECORDING

The built-in 14-day/8-event programmable timer permits recording of preset channels on preset days at preset times for preset lengths while you are eway.



Remote timer programming

For programming the timer, use the 10-digit keypad either on the recorder or the remote control unit.

On-screen timer programming

To program the timer, refer either to the recorder's FDP display or the TV screen using the on-screen display feature.

To engage the On-screen display mode

1. Turn on the TV receiver. Set to your video channel (3 or 4).
2. Press the TV/VIDEO button to engage the VIDEO mode.
3. Press the PROGRAM button; the TV screen picture will change to the On-screen Timer Set mode.

To cancel the On-screen display mode

With recorder:

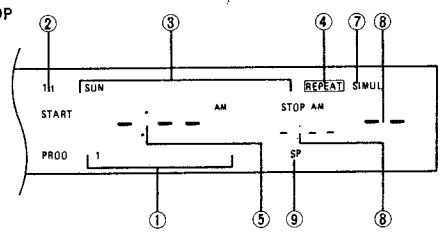
- Press the PROGRAM button with program number S having been called up on the screen, or simply press the DISPLAY button.

With remote control:

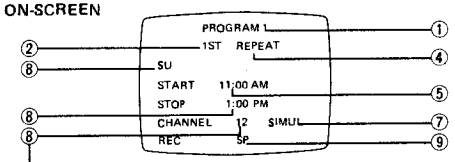
- Press the ON SCREEN button.
- Pressing the ON SCREEN button again calls up the on-screen display.

FDP and DN-SCREEN display

FDP



ON-SCREEN



- "TU OFF" appears when the SOURCE SELECT switch is set to AUX; channel setting is not possible.

① Program number
- Available indication: 1 through 8
- Selectable with the PROGRAM button.

② Week
- Available indication: 1st or 2nd
- Switchable with numeric key "8".

⑧ Day
- Available indication: SUN, MON, TUE, WED, THU, FRI, SAT.
- Selectable with numeric keys "1" through "7".
- When daily serial recording is selected with numeric key "9" (DAILY), all days (or from MON through SAT, or from MON through FRI) and "REPEAT" appear.

④ Repeat indicator
- For repeated execution of the preset program.
- Called up or cancelled with numeric key "0" (REPEAT).

⑤ Start time
- Numeric key input.
- AM or PM switchable with the AM/PM/SC key (AM/PM/SIMUL on remote control).

⑧ Stop time
- Numeric key input.
- AM or PM switchable with the AM/PM/SC key (AM/PM/SIMUL on remote control).

⑦ Simulcast recording
- Called up or cancelled with the AM/PM/SC key (AM/PM/SIMUL on remote control).

⑧ Channel
- Numeric key input .
- If an invalid number is entered, the display is reset to "- -" after about 2 seconds.

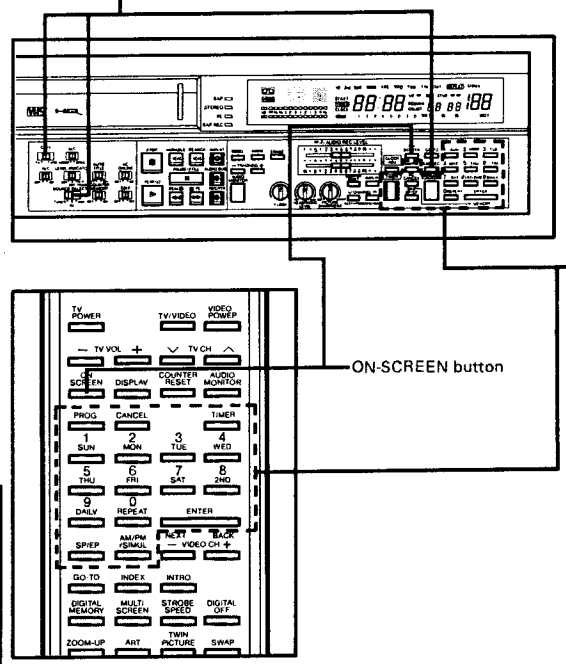
⑨ Recording mode
- Available indication: SP or EP
- Switchable with the SP/EP key.

Timer Setting Procedure

First of all, load a cassette (with safety tab in place); power will be switched on automatically.

Basic steps in programming
- Data input is possible where the cursor (blinking position) is located.
- Set the data and press the ENTER button; the data will be stored in memory.

Make sure of the settings of these switches:
SOURCE SELECT: TUNER
SAP REC: As required.
TV/CATV/HRC: As required.



1. Press PROGRAM.
   - The display will change to the Timer Set mode with "1st SUN" blinking and program number "1" displayed. You are ready to enter the data into No. 1 program memory. To change the program number, press the PROGRAM button the required number of times.
2. Key in the day, and press ENTER.
   - To set for the 2nd week, press [0] either before or after setting the day.
   - To set for weekly serial recording, press [0].
   - To set for daily serial recording, press [9].
3. Key in the start time and press ENTER.
   - To specify AM or PM, press AM/PM/SC either before or after setting the time.
   - Invalid time numbers will be rejected (see next page).
4. Key in the stop time and press ENTER.
   - Specify AM or PM in the same way for the start time.
5. To program FM simulcast recording, press AM/PM/SC (or AM/PM/SIMUL on remote control) to call up "SIMUL".
6. Key in the channel number and press ENTER.
   - Invalid channel numbers will be rejected.
7. Specify the recording speed by pressing SP/EP and press ENTER.
   - Now you can advance to the next program, if necessary, by pressing the PROGRAM button.
   - After all necessary programs have been preset, proceed to the next step.
8. Press TIMER.
   - The TIMER indicator will light. (For error indications, see next page.)
   - The display will return to the Clock mode, also showing the program numbers for which recording data has been programmed.

Variety of day setting possibilities

Setting	Procedure
One day of the 1st or 2nd week.	Numeric keys "1" – "7" (and "8" for 2nd).
Weekly serial from the 1st week.	Numeric keys "1" – "7" and "0" for REPEAT.
Weekly serial from the 2nd week.	Numeric keys "1" – "7", "8" for 2nd, and "0" for REPEAT.
Daily serial (SUN through SAT) for one week or every week.	Numeric key "9" for all days. • Press once to obtain SUN through SAT. • Press again for MON through SAT. • Press again for MON through FRI. • "REPEAT" appears automatically with these indications. • For daily serial recording only for one week, cancel "REPEAT" with numeric key "0".
Daily serial (MON through SAT) for one week or every week.	
Daily serial (MON through FRI) for one week or every week.	

IMPORTANT INFORMATION ON TIMER RECORDING

Setting the timer
- Enter the data while the corresponding indication is blinking (about 60 seconds). If no command is entered within one minute, the display will return to the Clock mode.
- It is not possible to engage the Timer Set mode unless the clock time has previously been set.
- The CHANNEL NEXT/BACK (VIDEO CH on remote control) buttons can be used to move the cursor. Use this function to reach positions which require correction. Press NEXT to move the cursor forward; press BACK to move the cursor back.
- If an invalid number is entered in time setting, the entered data is cleared and the display returns to a blinking "-:--" when the ENTER button is pressed. In case of correct entry, the blinking position advances to the next.

Last-channel memory
- The correctly tuned channel locks in the Timer Set mode and, when the display returns to the Clock mode, the locked channel is displayed.

Cancelling the preset data
- The preset programs can be cancelled by pressing the CANCEL button. For this purpose, first engage the Timer Set mode for the number you wish to cancel and then press the CANCEL button.

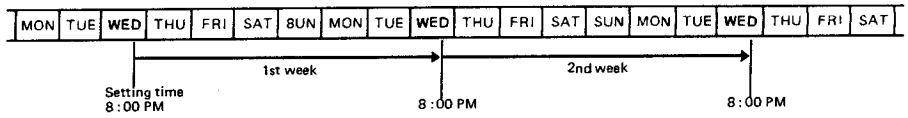
Reviewing the programmed data
- Press the PROGRAM button in the Timer Standby mode; the programmed data of the earliest-to-start program will be shown for 6 seconds and then those of subsequent programs, if any, in the same manner.
- To return to the Clock mode, press the DISPLAY button.
- If you wish to change to the programmed data, engage the Timer Set mode (first press the TIMER button to disengage the Timer Standby mode and then press the PROGRAM button) and call up the corresponding program number for reprogramming.

Error indication
- When the TIMER button is pressed with a cassette loaded and the timer correctly programmed, the TIMER indicator on the display will light together with the corresponding preset program number(s) and the power will turn off.
- If two or more programs have overlapping times, the numbers of those programs will blink rapidly for 10 seconds after the TIMER button has been pressed. If no change is made in the programming, later programs will begin only after earlier programs are completed.
- When you have preset several programs at a time, confirm that all the preset program numbers light together with the TIMER indicator when the TIMER button is pressed. The program whose number does not light has not been correctly preset. Recheck the programmed data.
- If all programs have been wrongly preset, the TIMER indicator will blink for about 10 seconds when the TIMER button is pressed, and then the Timer Standby mode will be cancelled.
- If the TIMER button is pressed when a cassette is not loaded, the TIMER indicator will continue blinking. Also, a programmed timer recording will not be executed after the start time has passed, even if you insert a cassette.
- If a cassette with its safety tab removed has been loaded, it will be ejected automatically when the TIMER button is pressed. The TIMER and [OO] indicators will continue blinking.
- As long as the TIMER button is engaged with the TIMER indicator lit, unloading of a cassette is not possible.

Timer operation
- Tape loading starts 20 seconds before the preset switch-on time and the recording start signal is triggered 2 seconds before the preset time so that recording starts exactly at the preset time.
- During timer recording, the number of the program that is presently operating will be blinking.
- After timer recording, the power is switched off and the auto-rewind mechanism does not function. If the end of the tape is reached during timer recording, the cassette is automatically ejected and then the power is switched off with the TIMER indicator blinking.
- If a power failure should occur (and last longer than 60 minutes), not only time-keeping stops (see page 19), but also all the preset data will be cancelled. (A blinking SUN AM 12:00 indicates this after power has been reapplied.) In such cases, first correct the time indication and then re-enter the programming data.

Note:
- The 1st week or 2nd week do not refer to weeks on the calendar; the 1st week refers to the seven-day period from the present day and the 2nd week, to the following seven-day period. These two weeks are counted from the time of setting.

If the current day and time of setting are Wednesday, 8:00 PM:


MON TUE WED THU FRI SAT SUN MON TUE WED THU FRI SAT SUN MON TUE WED THU FRI SAT
1st week
2nd week
Setting time
8:00 PM
8:00 PM
8:00 PM

RECORDING PM SIMULCAST TV PROGRAMS

FM simulcast TV programs can be recorded using an FM stereo tuner. Connect necessary components. (Connect the FM tuner to the AUDIO IN connectors.) Select the TV channel broadcasting the simulcast program with the recorder's channel select buttons and tune the FM stereo tuner to the station broadcasting the soundtrack for this TV program.
The only difference from the basic recording procedure (described on page 23) is the setting of the SOURCE SELECT switch.

- Set the SOURCE SELECT switch to SC.
  Then the SC indicator will light. With this setting, the audio signals from the built-in tuner will be recorded on the normal audio track and the audio signal from the FM stereo tuner will be recorded on the hi-fi audio track.

Notes:

- After finishing recording, be sure to set the SOURCE SELECT switch to TUNER.
- While recording simulcast programs, the hi-fi sound might be distorted momentarily at switching points between different programs (at the insertion of commercials, for example). This is not due to any defect of the unit.

RECORDING A TV PROGRAM WHILE RECORDING AN INDEPENDENT AUDIO SOURCE

Using the "simulcast" recording function, you can record independent audio and video programs, because the TV soundtrack is not lost, but recorded on the normal audio track. While recording a TV program, record any audio source independently.

- Connect an audio component (such as an FM tuner) to the AUDIO IN connectors.
- Set the SOURCE SELECT switch to SC.

Notes:

- If you stop recording to avoid unwanted material of the TV program using the PAUSE/STILL button, the audio program from the external source is also cut.
- If television broadcasting comes to an end during recording, the hi-fi sound being recorded from the external source may be distorted. It is recommended that you check the timetable of TV broadcasts in advance.
- After finishing recording, be sure to set the SOURCE SELECT switch to TUNER; otherwise recording on the hi-fi audio track from the built-in tuner will not be possible.

USING THE HR-D630U AS AN AUDIO DECK

Audio-only recording

You can record audio only (without recording any video signal) on the normal and hi-fi audio tracks. This means you can record a continuous 8-hour FM program onto a single cassette (T-160).

- Connect an audio source (such as an FM tuner) to the AUDIO IN connectors.
- DO NOT connect any equipment to the VIDEO IN connector.
- Set the SOURCE SELECT switch to AUX.

AUDIO DUBBING

Audio dubbing means recording a new soundtrack on a pre-recorded tape. In other words, the previously recorded sound is erased and replaced with a new soundtrack. **Audio dubbing is applicable only to the longitudinal audio track (normal audio).** Therefore, a dubbed narration can be heard together with the original hi-fi sound.

Procedure

1. Switch on the TV receiver.
   - Adjust the TV receiver's channel to your video channel (3 or 4).
2. Load a pre-recorded cassette. Power will be switched on automatically.
3. Connect a microphone or an audio source to the MIC jack or the AUDIO IN connectors respectively.
   - With both microphone and audio source connected, mixed sound is recorded.
4. Set the SOURCE SELECT switch to AUX.
   - If you record sound only from the microphone, the source equipment connected to the AUDIO IN connectors should be off.
5. Press the PLAY/X2 button to start playback and then press the REW or FF button to search for the point from which you wish to start audio dubbing.
6. Press the PAUSE/STILL button at the start point of audio dubbing.
7. Press the AUDIO DUB button.
8. Press the PLAY/X2 button.
   - Audio dubbing will start.

Notes:

- It is recommended that you use a lower-impedance microphone.
- If a stereo source is connected to the AUDIO IN connectors, the mixed L and R sound is recorded.
- If whistling or howling is heard during audio dubbing, reduce the TV volume or move the microphone farther away from the TV. Recording is being performed even if sound is not heard from the TV receiver. If you want to monitor the sound being recorded, connect headphones to the HEADPHONE jack.

INSERT EDITING

Insert editing means recording a new scene into a section of pre-recorded tape so that a part of the original recording can be replaced with a new sequence without excessive picture distortion at edit-in and edit-out points. Thanks to the flying erase head, clean edits can be obtained. New video and audio signals to be inserted can come either from another video cassette recorder or the built-in tuner.

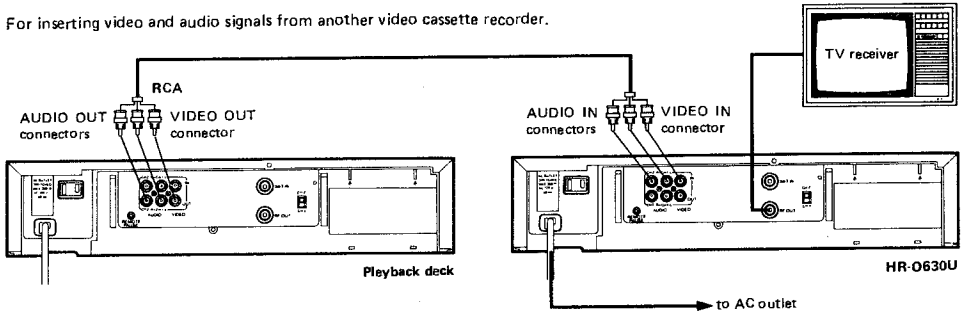
CAUTION
Since video and audio signals are recorded simultaneously, both are replaced with new recordings simultaneously. However, the normal audio soundtrack remains unchanged.

Setting options of the relevant switches

Source \ Switch	SOURCE SELECT switch
To insert programs from a different tape	AUX
To insert TV programs from the built-in tuner	TUNER
To insert FM simulcast programs	SC

Connection

For inserting video and audio signals from another video cassette recorder.



Procedure

1. Switch on the TV receiver.
   - Adjust the TV receiver's channel to your video channel (3 or 4).
2. Load a pre-recorded cassette.
3. Press TV/VIDEO to engege the VIDEO mode (the indicator lights).
4. Set the SOURCE SELECT switch as required. (See chart above.)
5. Set the Hi-Fi audio recording level. (See page 17.)
6. Play back the tape to determine the edit-out point (the end of the tape section to be replaced).
7. Press the PAUSE/STILL button at the edit-out point.
8. Press the COUNTER RESET button.
   - The tape counter will be reset to "0000".
9. Press the REW button to determine the edit-in point (the beginning of the tape section to be replaced).
10. Press the PAUSE/STILL button at the edit-in point.
11. Press the INSERT button.
    - This engages the Insert Standby mode in which the input signal can be monitored on the TV screen; the still picture changes into the input signal that you are going to record.
    - The input sound signal can also be monitored.
12. Operate the source equipment properly.
    - Play back on another recorder the tape program to be inserted.
    - Select the channel to be recorded.
    - Select the channel and set the FM tuner.
13. Press the PLAY/X2 button to start insert editing.
    - Now video and audio signals will be recorded simultaneously.
    - At the counter reading of "0000", recording will stop automatically.
    - The tape will continue running in the Play mode.

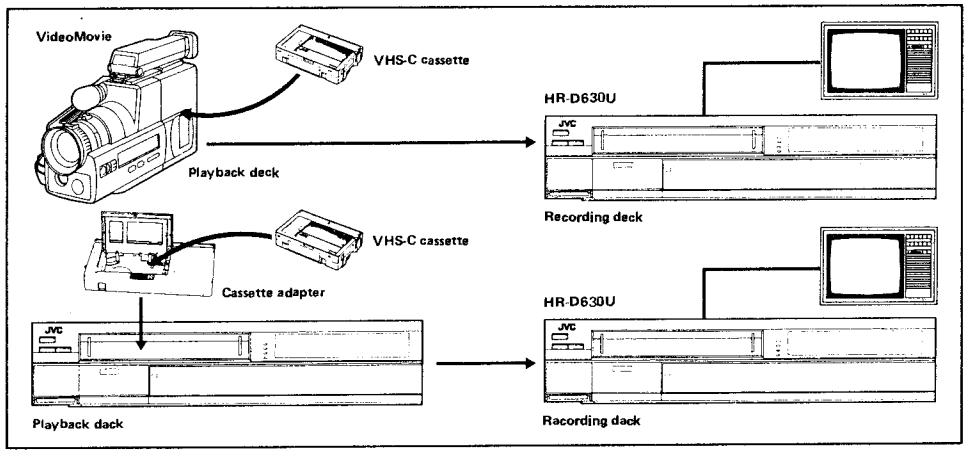
Notes:

- Do not use the STOP button to stop insert editing. If you press the STOP button, the tape stops and the Insert Edit mode is cancelled.
- If you wish to stop insert editing before the specified edit-out point is reached, press the COUNTER RESET button. Then the Play mode will be entered.
- The recording mode (SP or EP) is automatically determined by the previous recording on which the new segment is inserted regardless of the setting of the SP/EP switch.
- If the edit start point of the new scene lies in the SP mode and the edit end point of the same scene lies in the EP mode or vice versa, the inserted picture will distort at the switching point in the recording mode.
- If there is a non-recorded section on the tape, the Insert Edit mode will be cancelled automatically and the Play mode will be engaged.
- Insert editing is not possible with non-recorded cassettes or cassettes whose safety tab has been removed.

TAPE-TO-TAPE EDITING

VideoMovie recordings can be edited by using a VideoMovie camcorder (with playback facility) or a 2nd video deck.

Through use of a cassette adapter, VideoMovie recordings can be treated just like regular VHS cassettes.



- Connect the playback deck's VIDEO OUT and AUDIO OUT connectors (or the VideoMovie's AV OUT) to the recording deck's VIDEO IN and AUDIO IN connectors.
- Set the recording deck's SOURCE SELECT switch to AUX.
- Put the playback deck in the Play mode.
- Put the recording deck in the Record mode.

Tips for obtaining better results

The quality of the edited tape may vary depending on the position of the EDIT switch. It is recommended that you first make some trial recordings.

EDIT OFF ON

- With the EDIT switch of the playback deck set to ON and recording deck to OFF,
- With the EDIT switch of both playback and recording decks set to ON, and
- With the EDIT switch of both decks set to OFF.

Choose the setting combination that best suits your preference.

Note: Also refer to the instruction manual of the 2nd video recorder you are using.

RECORDING WITH A VIDEO CAMERA

Connection

To connect a video camera, an appropriate camera adapter is necessary.

- Connect the video camera to the camera adapter.
- Connect the camera adapter to the HR-D630U: adapter's VIDEO OUT to recorder's VIDEO IN, adapter's AUDIO OUT to recorder's AUDIO IN, and adapter's PAUSE to recorder's REMOTE PAUSE.

For proper connection of a camera to the HR-D630U, consult a JVC dealer.

Operation

1. Turn the power on for all connected equipment.
2. Adjust the TV receiver to your video channel.
3. Load a cassette.
4. Set the SOURCE SELECT switch to AUX.
5. Press the TV/VIDEO button to obtain the VIDEO indication on the FDP.
6. Set the SP/EP button as required.
7. Press the REC/ITR and then the PAUSE/STILL button.
   - The recorder enters the Recording Standby mode.
8. Operate the camera's start/stop switch.
   - Recording starts and stops with this switch.
9. To end the recording, press the STOP button.

Notes:

- If feedback noise (whistling or howling) is heard from the TV receiver, reduce the volume or move the camera's microphone farther away from the TV receiver.
- For camera operation refer to the instruction manual for the relevant camera.

ADVANCED USAGE

IN CASE OF DIFFICULTY

What may initially appear to be trouble is not always a real problem. Make sure first . . . .

POWER AND TAPE TRANSPORT PROBLEMS

Symptoms	Check points
No power is applied to the recorder.	• Is the power cord disconnected? – Connect it.
Clock is functioning properly, but the recorder cannot be powered.	• Is the TIMER indicator lit on the FDP? – Press the TIMER button to turn off the indicator.
Tape does not run during recording.	• Is the PAUSE/STILL button pressed to ON? – Press the PLAY/X2 button.
Tape stops in the Rewind or Fast Forward mode.	• Is the COUNTER MEMORY function engaged? – Set it to OFF.
Tape will not rewind or fast forward.	• Is the tape already fully rewound or fast forwarded? – Check the cassette.

RECORDING PROBLEMS

Symptoms	Check points
Recording cannot be started.	• Is a cassette loaded? • Is the safety tab on the cassette removed? – Reseal the slot with cellophane tape.
TV broadcasts cannot be recorded.	• Is the SOURCE SELECT switch set to AUX? – Set it to TUNER.
Camera recording is not possible.	• Are the camera and the camera adapter correctly connected? • Is the power switch of the camera adapter set to ON? • Is the SOURCE SELECT switch set to a position other than AUX? – Set it to AUX.
Simulcast recording is not possible.	• Is the SOURCE SELECT switch set to a position other than SC? – Set it to SC. • Is an audio source correctly connected to the AUDIO IN connectors? – Check connections.
Timer recording is not possible.	• Have you set the clock correctly and programmed the timer correctly? – Check once again. • Is the TIMER indicator lit on the FDP? – If not, press the TIMER button to light the indicator.

PLAYBACK PROBLEMS

Symptoms	Check points
Playback picture does not appear while the tape is running.	• Is the TV receiver's channel selector set to the correct video channel? – Set it to the RF converter channel (3 or 4). (See page 12.)
Noise appears on the search and still pictures.	• This is normal.
Noise appears during normal playback.	• Adjust the TRACKING buttons.
Playback picture is blurred or interrupted while TV broadcasts are clear.	• Video heads may be dirty. – Head cleaning is necessary. Consult your nearest JVC dealer.

HI-FI AUDIO PROBLEMS

Symptoms	Check points
TV sound cannot be recorded on hi-fi audio tracks.	• Is the SOURCE SELECT switch set to SC? – Set it to TUNER.
Breaks are noticeable in hi-fi audio reproduction.	• Adjust with the TRACKING control. (See page 18.)
Soundtrack on the hi-fi audio track cannot be reproduced.	• Is the AUDIO MONITOR select button set to NORMAL? – Set it to Hi-Fi.
Audio level indicators do not function.	• Is the LEVEL INDICATOR switch set to OFF? – Set it to ON.

OTHERS

Symptoms	Check points
Whistling or howling is heard from TV during camera recording.	• Move camera's microphone away from TV or reduce TV sound volume.
Clock setting is not possible.	• Is the TIMER indicator lit on the FDP? – Press the TIMER button to turn off the indicator.
Some channels are skipped over when scanning channels.	• Those channels are preset to be skipped over. If you need them, restore them. (See page 14.)
Channel cannot be switched.	• Is recording in progress? – Press the PAUSE/STILL button, select a desired channel and press the PLAY/X2 button.
Snowy picture on screen when viewing TV programs while recording another program.	• Is the VIDEO indicator lit? – Press the TV/VIDEO button so that the indicator extinguishes.

This recorder contains microcomputers. External electronic noise or interference could cause malfunctioning. In such cases, switch the power off and unplug the power cord. After a few minutes, plug it in again and switch on. Take out the cassette. After checking the cassette, operate the unit as usual.

HEAD CLEANING

- Picture playback may become blurred or interrupted while the TV program received is clear. This does not mean that the recorded program has been erased.
- Dirt accumulated on the video heads after long periods of use causes such troubles. In this case, head cleaning requiring highly technical care is necessary.

* For head cleaning, consult the nearest JVC dealer.

SPECIFICATIONS

Format	: VHS NTSC standard with Hi-Fi audio
Video recording system	: Rotary, two-head helical sean system with slant double-azimuth combination video heads
Hi-Fi audio recording system	: Deep-layer recording system conforming to stereo Hi-Fi VHS standard
No. of audio channels	: 2 Hi-Fi audio channels 1 normal audio channel
Video signal system	: NTSC-type color signal
Tape width	: 12.65 mm (1/2 inch)
Tape speed	
(SP)	: 33.35 mm/s (1-5/16 ips)
(EP)	: 11.12 mm/s (7/16 ips)
Maximum recording time	
(SP)	: 160 min. with T-160 video cassette
(EP)	: 480 min. with T-160 video cassette
Temperature	
Operating	: 5°C to 40°C (41°F to 104°F)
Storage	: -20°C to 60°C (-4°F to 140°F)
Antenna	: 75 ohms, unbalanced
Channel coverage	
(VHF)	: Channels 2 – 13
(UHF)	: Channels 14 – 69
(CATV)	: 113 channels
RF output signal	: Channel 3 or 4 (switchable; preset to channel 3 when shipped) 75 ohms, unbalanced
Power requirement	: AC 120 V~, 60 Hz
Power consumption	: 44 W
Video	
Input	: 0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output	: 1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio	: 45 dB (Rohde & Schwarz noise meter) with PICTURE SHARPNESS control at center position
Horizontal resolution	: 240 lines with PICTURE SHARPNESS control at center position
Audio	
Input	: -8 dBs, more than 50 k-ohms, unbalanced
Output level	: -6 dBs, high impedance load
Output impedance	: Less than 1 k-ohm, unbalanced
Signal-to-noise ratio	: More than 40 dB (Normal audio)
Frequency range	: 70 Hz to 10,000 Hz (Normal audio)
Hi-Fi audio	
Frequency response	: 20 Hz to 20,000 Hz
Dynamic range	: More than 90 dB
Wow and flutter	: Less than 0.005 % WRMS
Timer	: 14-day programmable timer 8 programs with repeat function
Dimensions	: 435 mm(W) x 95 mm(H) x 379 mm(D) (17-3/16" x 3-3/4" x 14-7/8")
Weight	: 8.0 kg (18.0 lbs)
Provided accessories	: Infrared remote control unit "AA"-size battery x 2 Matching transformer Antenna extension cable Antenna splitter Antenna cable (F-type) Audio cable Video cable

Specifications shown are for SP mode unless otherwise specified.
Design end specifications subject to chenge without notice.

SECTION 1
MECHANISM ADJUSTMENT

1.1 GENERAL

1.1.1 Precautions

IMPORTANT:

1. Disconnect unit from power before removing or soldering components.
2. When removing a fastener (screw, washer, etc.), be careful not to drop it into the mechanism. If a fastener should be dropped, be sure to retrieve it.
3. The tape transport mechanism has been precisely adjusted at the factory and ordinarily does not require readjustment.
4. When removing a part, be very careful not to damage or displace other parts. (Be especially careful with the tape guides and rotary video head drum.)
5. For service procedures that call for operation of the set when the cassette housing is separated from the main-deck, perform as below.

1) Set a sheet of insulated material on the right of the chassis.
2) Remove the cassette housing from the main-deck and place it on the insulated sheet, but do not disconnect the connector from the M. CTL board.
3) Insert a cassette into the cassette housing. The housing mechanism functions to retract the cassette.
4) Disable the photo transistor sensor (END SENSOR) on the main-deck by applying an opaque cover.
5) The desired modes can be obtained by using the opration switches.

1.1.2 Required tsst equipmsnt, fixturas and tools

For proper mechanical adjustment, the following test equipment, fixtures and tools are strongly recommended. Without them, a long trial-and-error period would be necessary, resulting in possible damage. In addition, general-purpose tools are required.

1. Test equipment required:
   Color television or monitor
   Oscilloscope: Wide-band, dual trace, triggered, delayed sweep
   Recording tape
   Alignment tapes

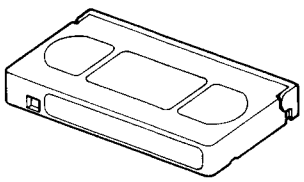
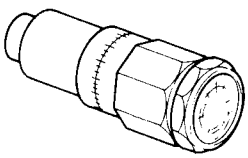
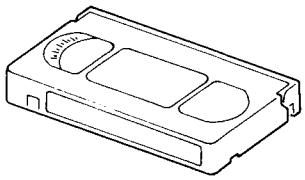
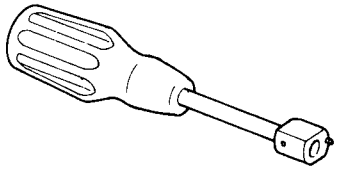
Alignment tape MH-1, MH-1L, MH-F1 	Torque gauge assembly PUJ48075-2 	Back tension cassette gauge PUJ48076-2 
A/CTL head position tool PUJ47351-2 		

Table 1-1-1 Fixtures and tools

1.1.3 Disassembly

1. Top cover
1) Take out five screws from the right, left and rear sides of the set.
2) Tilt up the rear end of the top cover, then remove it.

2. Front panel
1) Remove the top cover.
2) Bend three upper hooks of the front panel assembly upward to disengage them from their chassis retainers.
3) Disengage three lower hooks of the front panel assembly from their chassis retainers in order to remove the front panel assembly.

3. Bottom cover
1) Take out seven screws from the bottom side of the set.
2) Set free the bottom cover from its six retainers of the chassis in order to remove the bottom cover.

4. Cassette housing door
1) Remove the front panel assembly.
2) Bend center of the cassette housing door toward you, then pull out the right end from the cassette housing.
3) Use care regarding the torsion spring, then pull out the left end of the cassette housing door to remove it.

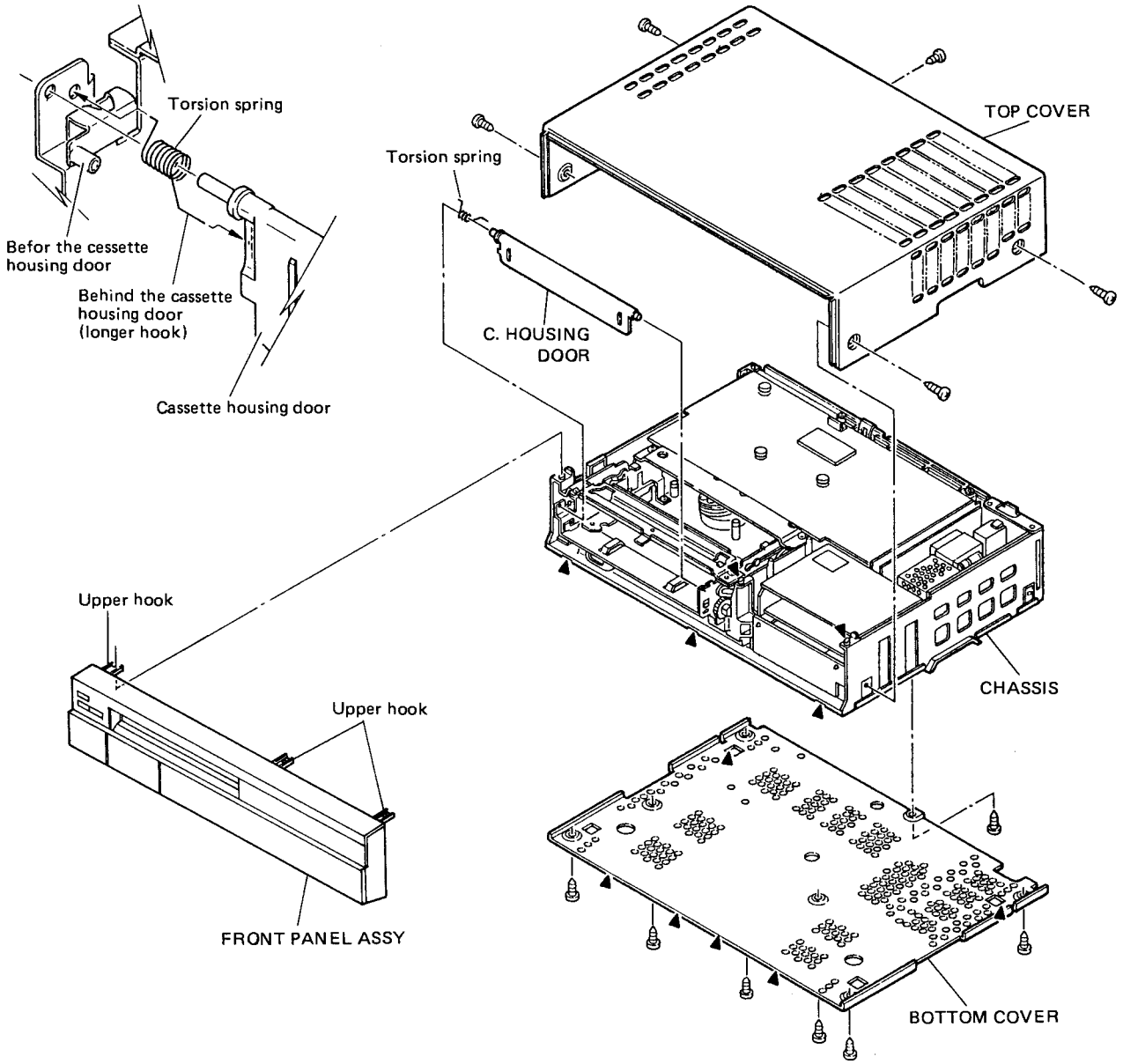


Fig. 1-1-1 Removal of external covers

1.1.4 Layout of main parts

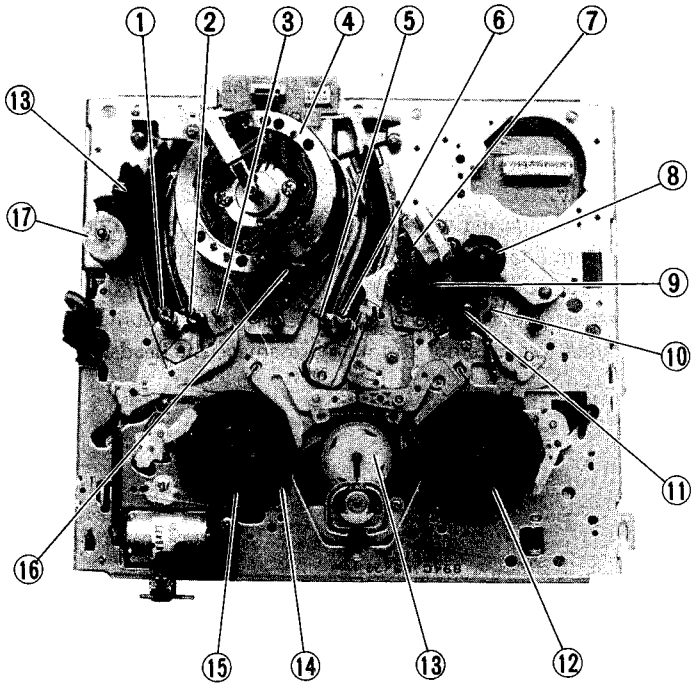


Fig. 1-1-2 Top view of main-deck

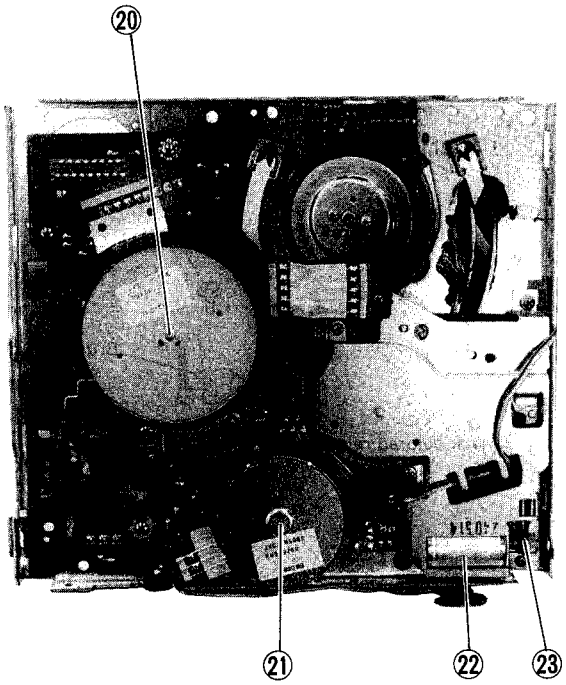


Fig. 1-1-3 Bottom view of main-deck

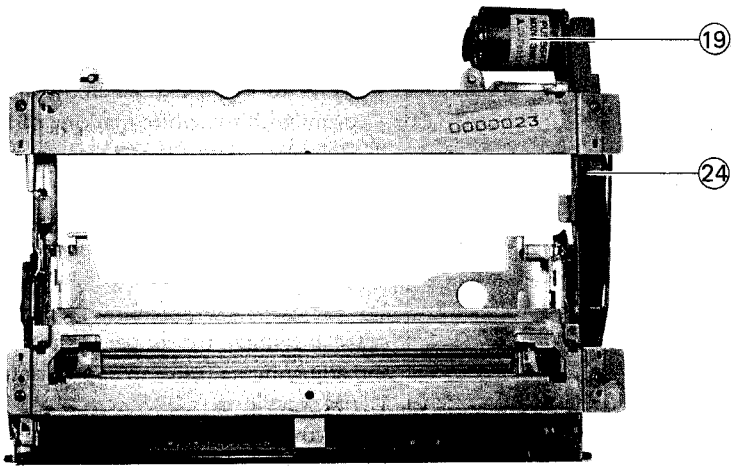


Fig. 1-1-4 Cassette housing

1. Supply guide roller
2. Supply slant pole
3. Tension pole
4. Upper drum
5. Take-up slant pole
6. Take-up guide roller
7. A/C head
8. Pinch roller
9. Take-up guide pole
10. Guide arm
11. Capstan
12. Take-up reel disk
13. Reel idler
14. Tension band
15. Supply reel disk
16. Lower drum
17. Impedance roller
18. Full erase head
19. Cassette motor
20. Capstan motor
21. Reel motor
22. Mode motor
23. Mode belt
24. Cassette belt

1.2 MAIN ASSEMBLY REPLACEMENT

No.	Item	Adjustment parts	Operating mode	Description
1	Upper drum assembly			**Note:** When installing the new upper drum, use care not to touch the video heads. If heads are soiled, clean with a soft, finely woven cotton cloth or chamois that has been moistened in alcohol. Hold lightly against the heads and turn the drum clockwise. By no means clean with a vertical stroke.
	– Removal –			1) Refer to Fig. 1-2-1. Take out screw (1) and remove the brush assembly. 2) Use a desoldering tool or desoldering braid to unsolder the upper drum boards. 3) Take out two screws (2) and raise the upper drum to remove it together with the upper drum board. (If this drum is to be reinstalled, use care not to touch or damage the heads.)
	– Installation –			1) Refer to Fig. 1-2-1. Align the black relay pin of the new upper drum with the white marking of the lower drum. 2) Reinsert screws (2) and tighten them in a balanced manner. 3) Reinstall and solder the upper drum boards. 4) Clean the drum assemblies (see above note). 5) Reinstall the brush assembly and secure with screw (1).
	– Checks and adjustments –			After installing the upper drum, perform the following checks and adjustments (refer to appropriate Sections of this Manual). 1) FM waveform 2) Servo circuit 3) Video circuit 4) FM audio circuit

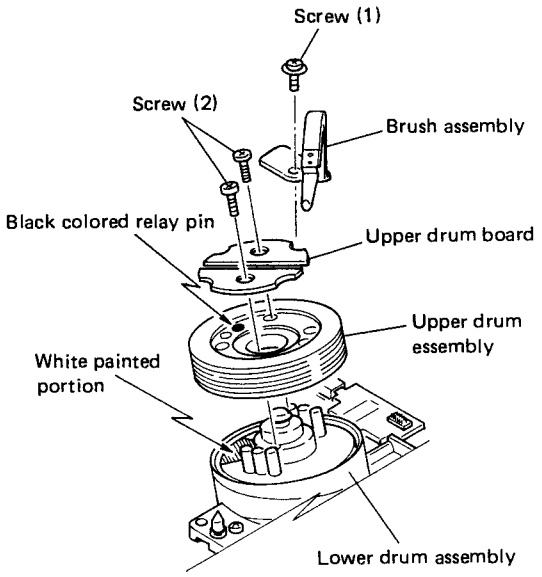


Fig. 1-2-1 Upper drum assembly

No.	Item	Adjustment parts	Operating mode	Description
2	A/C head (Audio/Control head) – Removal –			1) Disengage connectors attached to the A/C head board. 2) Take out two screws (1) and remove the A/C head together with the head base. 3) Unsolder and remove the A/C head board from the A/C head. 4) Take out screw (2) and remove the shield cap from the A/C head. 5) Take out three screws (3) and remove the A/C head from the head base. Use care regarding the three springs.

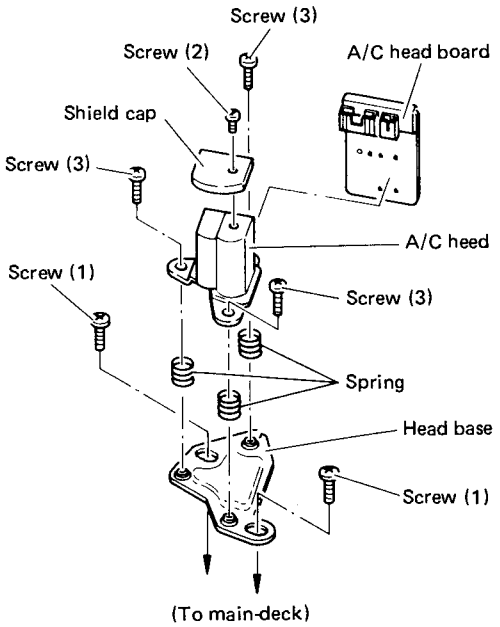


Fig. 1-2-2 A/C head

	– Installation –			1) Install the A/C head by reversing the removal steps of above. 2) Temporarily set the A/C head height above the head base for 6.6 mm (see Fig. 1-2-3).

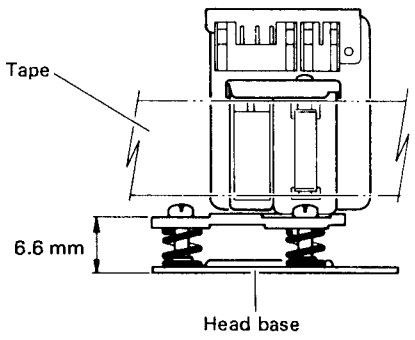


Fig. 1-2-3 A/C head height

	– Checks and adjustments –			1) Use a spare tape (not Alignment tape) and confirm proper operation of the tape transport (see Section 1.5). 2) Perform interchangeability adjustment (see Section 1.6).

No.	Item	Adjustment parts	Operating mode	Description
3	Tension band assembly			1) Take out screw (1) and disengage the tension band assembly from the tension arm assembly (see Fig. 1-2-4). 2) Remove and replace the tension band assembly. 3) Perform tension pole position adjustment (see Section 1.4).

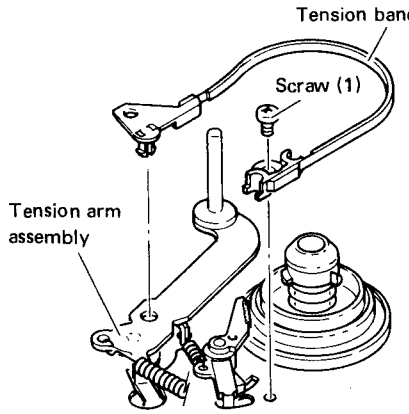


Fig. 1-2-4 Tension band assembly

1.3 ASSEMBLY PROCEDURE OF MECHANISM

No.	Item	Adjustment parts	Operating mode	Description
	A close relationship exists between the mode select switch and the mechacon circuit. Therefore, the mode select switch and control arm engagement determines the overall mechanical operations of the levers, gears, rollers, etc. If these parts are not properly positioned, the video deck becomes stalled in the unloading or Stop mode.			
1	Loading arm assemblies			These assemblies are comprised of loading gears, torsion springs and loading arms. 1) Refer to Fig. 1-3-1 and install the loading arm assemblies correctly.

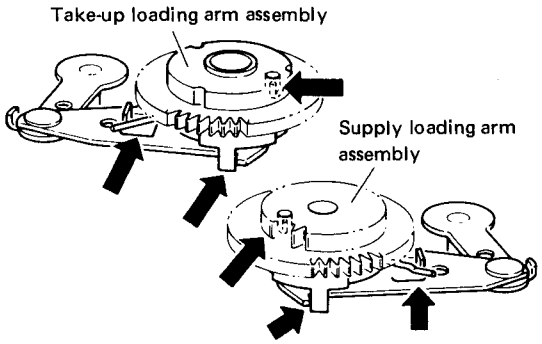


Fig. 1-3-1 Loading arm assembly (1)

2) The take-up and supply loading arm positions with respect to the loading gear holes are indicated in Fig. 1-3-2. This configuration is important to allow shifting to the next operation.

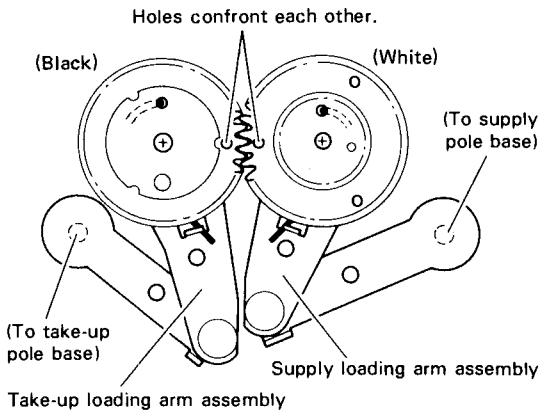


Fig. 1-3-2 Loading arm assembly (2)

No.	Item	Adjustment parts	Operating mode	Description
2	Control cam			1) Install the half loading cam on the cam bracket assembly, then mount the slide cam plate assembly so that its stud sets into the groove on the half loading cam. 2) Install the arm gear assembly on the cam bracket assembly. 3) Assemble the second gear and the control cam so that the stud of the control cam sets into the hole of the second gear. 4) Mount the above assembly (control cam and second gear) on the cam bracket assembly to satisfy the relation indicated in figure. 5) Do not turn the control cam from this position for the next step.
3	Cam bracket assembly			1) Refer to Fig. 1-3-4 and press the plate assembly toward the right to overlap the indicated hole with that of the main deck. 2) Then install the cam bracket assembly. **Note:** If the arm and loading gears do not mesh properly, use a jeweler's screwdriver or similar tool to engage the gear teeth while installing the cam bracket assembly.
4	Mode switch position			1) Engage the plate assembly and mode switch as shown in Fig. 1-3-5. Partially tighten screw (1) to where the switch can still be shifted for adjusting the position. 2) Press the plate assembly toward the right to where the holes are overlapped as in Fig. 1-3-4. Insert a jeweler's screwdriver into the holes to keep them aligned. 3) Shift the mode switch to align the V-notch as indicated in Fig. 1-3-5. Then tighten screw (1) to secure. 4) Remove the jeweler's screwdriver, then reinstall and solder the circuit board.

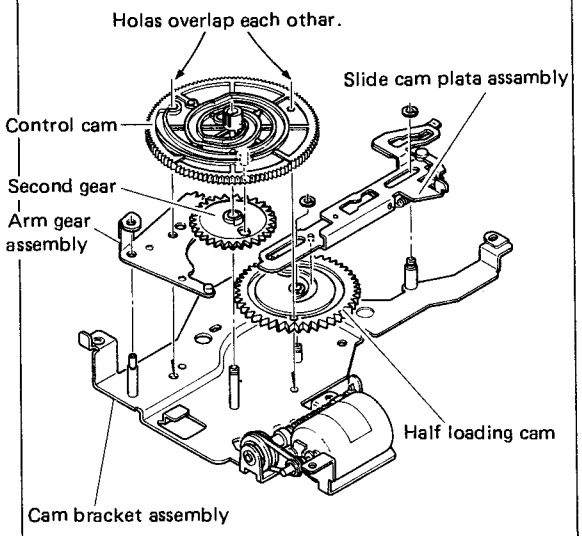


Fig. 1-3-3 Control cam

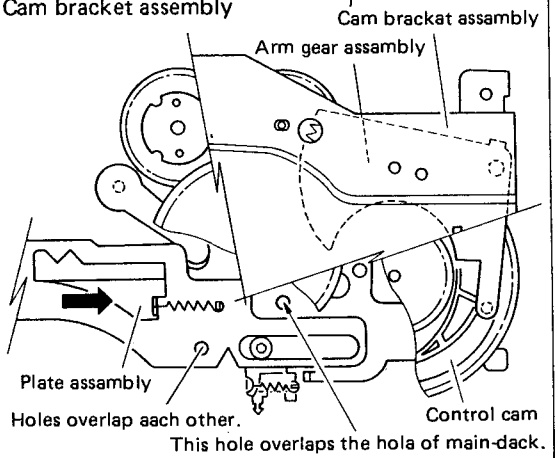


Fig. 1-3-4 Cam bracket assembly

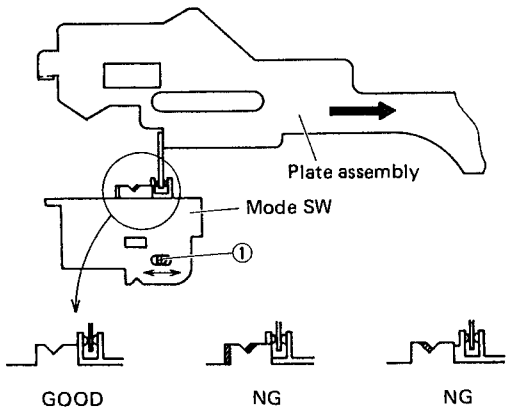


Fig. 1-3-5 Mode switch

1.4 CONFIRMATION AND ADJUSTMENT

No.	Item	Adjustment parts	Operating mode	Description
1	Tension pole position			1) Without a cassette tape, set for the Play mode (see Section 1.1). 2) Refer to Fig. 1-4-1. Slightly loosen screw (1). Adjust the tension band holder position for 0 mm separation between the tension arm and cutout position. 3) Tighten screw (1) to secure the tension band holder. 4) Use the back tension cassette gauge and set for the Play mode. 5) Check for a scale reading between 25 and 75. 6) If outside this range, clean the tension band contacting portions of the supply reel disk with alcohol, or check the condition of the tension arm spring. If necessary, replace the tension band assembly.
2	Take-up torque			1) Without a cassette tape, set for the Play mode (see Section 1.1). 2) Set the torque gauge on the take-up reel disk. 3) Grasp the torque gauge lightly so that it rotates and read the value when the scale matches the indicator needle. Confirm a value between 45 and 155. 4) If outside this range, clean the rubber portion of the idler arm with alcohol, or if necessary, check the reel motor drive circuit.

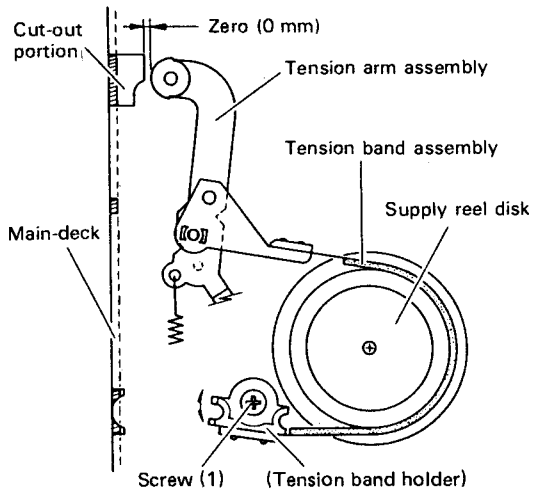


Fig. 1-4-1 Tension pole position

1.5 TAPE TRANSPORT CHECKS AND ADJUSTMENT PREPARATIONS

No.	Item	Adjustment parts	Operating mode	Description
	The tape transport system has been precision-adjusted at the factory and ordinarily does not require readjustment. However, adjustment may become necessary after long term usage or after replacing parts that affect the tape transport. The following steps mainly cover preparations for the interchangeability adjustments of Section 1.6.			
1	Guide roller			1) During interchangeability adjustments, the guide roller is turned with a flat-blade screwdriver to adjust its height and correct FM waveform linearity. Use a metric hex key (1.25 mm) to slightly loosen the setscrew at the base of the guide roller (see Fig. 1-5-1). Loosen the setscrew just sufficiently to allow the guide roller to be turned. If too loose, tape transport will be too unstable to permit correct adjustment.
2	Impedance roller			1) This compensates for tape running stability between the cassette and head drum. After adjusting the supply guide roller, the impedance roller height is adjusted for smooth tape transport at the lower flange. 2) Use a metric nutdriver (5.5 mm) to adjust by turning the upper nut (see Fig. 1-5-2). However, note that excess turning can disturb the FM waveform stability.
3	A/C head (audio/control head)			1) After adjusting the take-up guide roller, adjust the A/C head inclination for smooth tape travel at the lower flange of the take-up guide pole. Refer to Fig. 1-5-3.

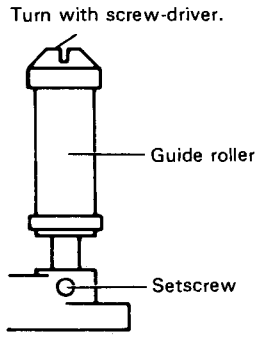


Fig. 1-5-1 Guide roller

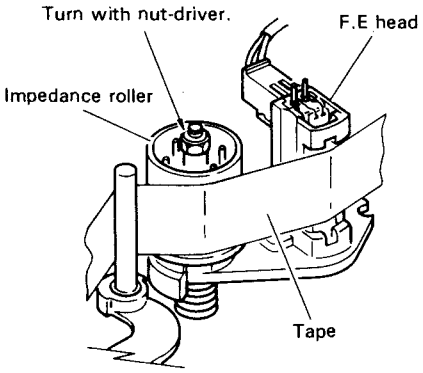


Fig. 1-5-2 Impedance roller

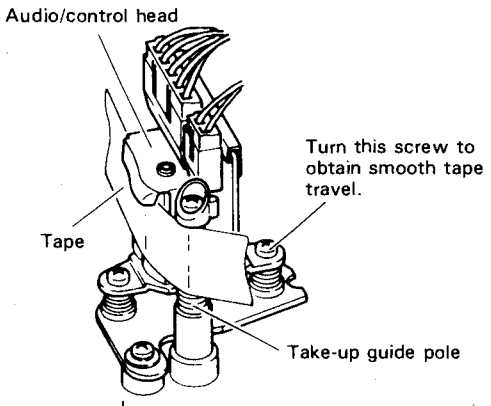


Fig. 1-5-3 A/C head

1.6 INTERCHANGEABILITY CHECKS AND ADJUSTMENTS

No.	Item	Adjustment parts	Operating mode	Description
	Before using costly Alignment tape, use a spare tape and confirm correct operation of the tape transport.			
1	FM waveform $\frac{b}{a} \geqq 0.7$, $\frac{c}{a} \geqq 0.5$ and $\frac{d}{a} \geqq 0.5$			1) Connect oscilloscope to the FM OUT testpoint of the video playback circuit. Trigger the oscilloscope externally with the signal from the drum flipflop (D-FF or FF) testpoint. Set the trigger slope to minus (—). 2) Play the MH-1 Alignment tape and adjust the tracking for maximum FM waveform output. Refer to Fig. 1-6-1. Confirm the relationships indicated in the figure for maximum output (a), minimum center output (b), minimum output at the drum intake (c) and minimum output at the drum output (d). 3) Adjustment is required if the above specifications are not fulfilled. Even when these are fulfilled, check that the FM waveform varies linearly overall. If not, slight deviation in tracking will cause a large proportional level drop to result in noise appearing in the picture. Therefore, in this condition, proceed to the following checks and perform adjustments where necessary. 4) Operate the tracking adjustment between minimum and maximum outputs of the FM waveform. Observe the portion of the waveform corresponding to the drum intake (see Fig. 1-6-2). As the tracking is adjusted, although the gain may increase or decrease, the geometric shape of this part of the waveform should remain consistent. If the shape varies, as shown by the incorrect examples in the figure, carefully perform adjustment of the supply guide roller height. 5) Next observe the portion of the waveform corresponding to the drum output (see Fig. 1-6-3), while operating the tracking adjustment. This should also vary only in gain, but not in shape. If the shape varies, as shown by the incorrect examples in the figure, carefully perform adjustment of the take-up guide roller height. 6) Check the overall FM waveform. Fine-adjust both guide rollers so that variation is as minimum and linear as possible. 7) Observe the tape travel at the guide rollers and guide poles. Confirm absence of tape creasing or curling. Confirm that the tape properly rides at the lower flange of the supply guide pole. Carefully adjust the guide pole height if necessary. This adjustment is important and affects FM waveform response. If creasing or curling is observed at the take-up guide pole, carefully adjust the audio/control head inclination so that the tape rides properly at the lower flange of the guide pole. Finally, again check the FM waveform.

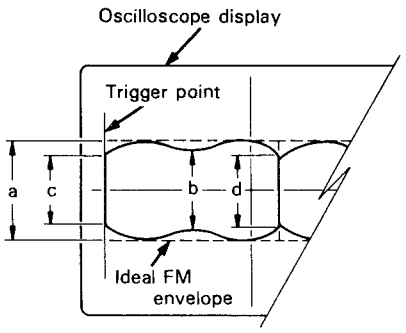


Fig. 1-6-1 FM envelope

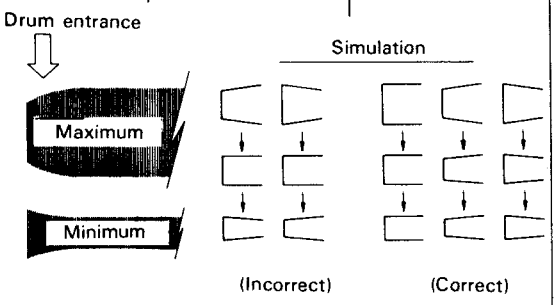


Fig. 1-6-2 Drum entrance

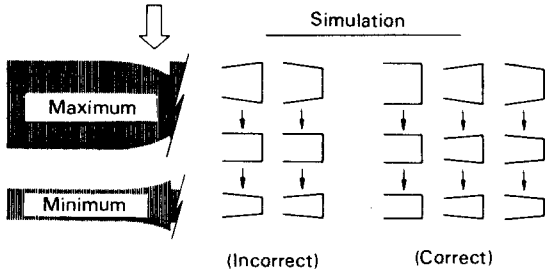
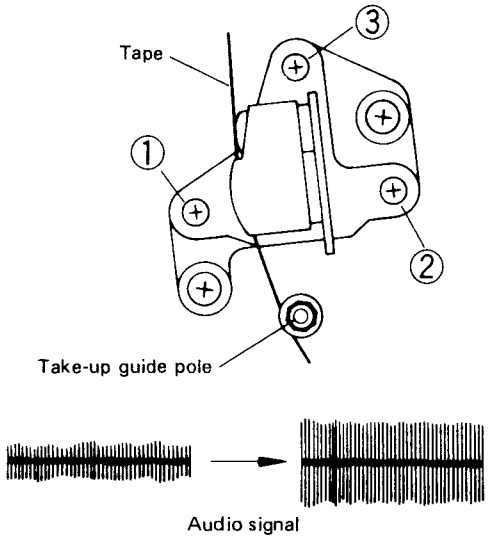
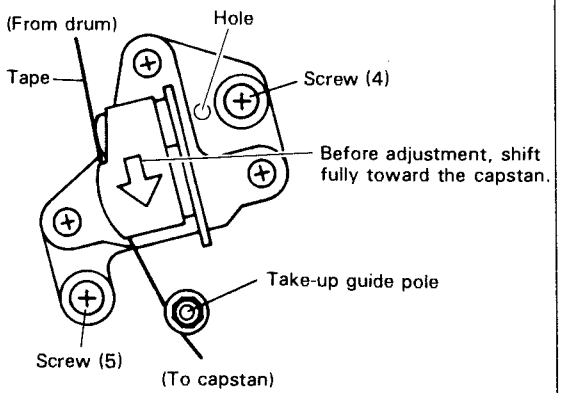


Fig. 1-6-3 Drum exit

No.	Item	Adjustment parts	Operating mode	Description
	Proper adjustment of the A/C head position is important for ensuring adequate audio output and S/N. Severe misalignment can prevent control signal pick-up and cause servo instability. Precise adjustment is particularly important for models that include tape indexing and addressing features, since these rely on control signal coding for operation. To observe the audio signal, connect an oscilloscope to the test point (AUDIO OUT) of the audio circuit, or directly to the audio output terminal. In some cases, monitoring the sound with headphones may be helpful.			
2	A/C head adjustments  Audio signal Fig. 1-6-4 A/C head			1) Play the stairstep (audio 7 kHz) portion of the MH-1 Alignment tape. 2) Adjust screw (3) (Fig. 1-6-4), which is the azimuth adjustment, for maximum output. 3) Turn screws (1), (2) and (3) by small and equal increments (about 45° at a time) to adjust the A/C head height for maximum audio output. Slightly raise and lower the height to confirm the maximum output position. 4) Observe the FM waveform and tighten the guide roller setscrews. Use care not to disturb the height adjustments. Then again confirm the FM waveform.
	This determines the distance between the sound and picture information on the tape. Correct adjustment is important for providing synchronization of picture and sound in the program. Incorrect adjustment is particularly noticeable in the slow speed (EP) mode. Observe the FM waveform by connecting an oscilloscope to the video play-back circuit test point (FM OUT). Trigger the oscilloscope externally with the drum flipflop signal. Use plus (+) trigger to view the CH-2 waveform. Set the tracking adjustment to the neutral (AUTO) position.			
3	Control head phase (X value)  Fig. 1-6-5 Control head phase			1) Play the stairstep portion of the MH-1 Alignment tape. 2) See Fig. 1-6-5. Slightly loosen screws (4) and (5). Set the A/C head positioning tool over screw (4) with the pin of the tool inserted into the indicated hole. 3) Turn the tool counterclockwise to shift the A/C head fully toward the capstan direction. 4) While observing the CH-2 FM waveform, gradually turn the tool clockwise. Stop at the peak output position and tighten screw (5). Remove the tool and tighten screw (4). 5) Replace alignment tape MH-1L with MH-1, play back the stairstep segment of the alignment tape MH-1L. 6) Operate the tracking adjustment and confirm that the maximum FM waveform is obtained at the neutral setting. 7) If the FM output peak is not obtained at tracking neutral position, shift the A/C head at the FM output peak nearest to this position.

No.	Item	Adjustment parts	Operating mode	Description
4	Final checks			1) Supply a video or TV signal (monochrome is preferable). Use a spare tape and record and play back. Confirm that the play-back FM signal conforms to the parameters indicated in Fig. 1-6-1. Check for both SP and EP modes. 2) Connect the oscilloscope to the test point (FM OUT) of the FM audio play-back circuit. Play the stairstep portion (which includes the FM audio carrier) of the MH-1L Alignment tape. Confirm absence of severe drop in FM waveform level. 3) Perform the checks and, if necessary adjustments, of the Electrical Adjustments Section for the servo, video and audio (and FM audio) circuits.

SECTION 2
ELECTRICAL ADJUSTMENTS

2.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.
It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

2.1.1 Required test equipment

1. Color television or monitor
2. Oscilloscope: wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Audio generator
5. Audio voltmeter
6. Digital voltmeter
7. Signal generator: TV-channel
8. Signal generator: NTSC color bars, stairstep
9. Recording tape
10. Alignment tapes: MH-1, MH-1L, MH-1H

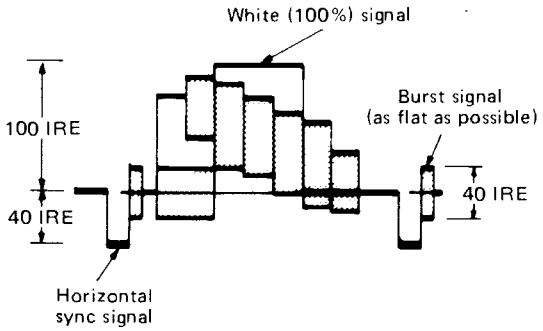


Fig. 2-1-1 Color bars signal of pattern generator

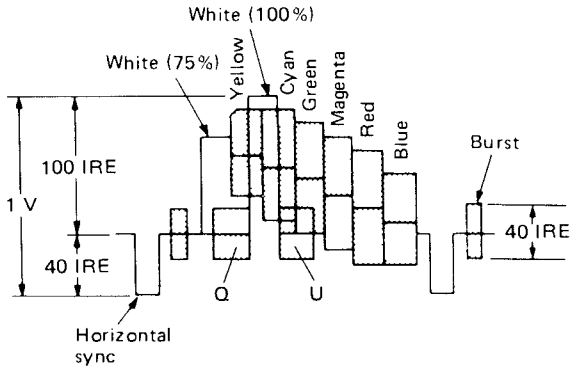


Fig. 2-1-2 Color bars signal waveform

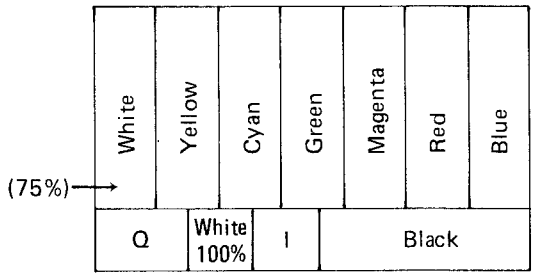


Fig. 2-1-3 Color bars pattern

2.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

No. Checks and adjustments are numbered in the recommended sequence in which they are to be performed.

Item Name assigned to the particular check and adjustment step.

Check Point Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.

Adjustment Parts Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.

Signal & Mode

- Input signal required to perform adjustment. Dash (—) indicates that special signal is not required.
- Equipment operating mode at time of check or adjustment.

Color bars	Color bar signal as video input.
Stairstep	Stairstep signal as video input.
1 kHz	1 kHz sinewave as audio input signal.
MH-1 color bars	Color bar segment of MH-1 alignment tape.
MH-1 stairstep	Stairstep segment of MH-1 alignment tape.
MH-1 1 kHz	1 kHz audio signal segment of MH-1 alignment tape.
MH-1 RF sweep	RF sweep segment of MH-1 alignment tape.
MH-1L color bars	Color bars segment of MH-1L alignment tape.
MH-1L stairstep	Stairstep segment of MH-1L alignment tape.
MH-1L RF sweep	RF sweep segment of MH-1L alignment tape.
MH-1M color bars	Color bar segment of MH-1M alignment tape.
MH-1M stairstep	Stairstep segment of MH-1M alignment tape.
MH-1H color bars	Color bar segment of MH-1H alignment tape.
MH-F1 stairstep	Stairstep segment of MH-F1 alignment tape.
MH-F1 1 kHz	1 kHz FM audio signal segment of MH-F1 alignment tape.
E-E	Power on and machine in Stop mode.
REC	Recording mode
PB	Playback mode
SEARCH	Search (FWDS and REVS) playback mode
SLOW	Slow motion playback mode
STILL	Pause during playback mode
A DUB	Audio dubbing mode
SP mode	SP recording speed
EP mode	EP recording speed
LP mode	LP recording speed

Description This column provides an explanation of the step, notes and adjustment values, and reference to waveforms where applicable.

2.2 SWITCHING REGULATOR CIRCUIT

Note: Unless otherwise noted, all test points and adjustments are located on the SWITCHING REGULATOR board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	5 V DC output voltage	CN6-1	R29	• REC • SOURCE SEL: TUNER	1. Connect a digital voltmeter between CN6-1 and TP-GND. 2. Record in the TUNER mode, adjust R29 for 5.33 ± 0.05 V.
2	SEMIREG 15 V output voltage	CN1-7	R100	• REC • SOURCE SEL: TUNER	1. Connect a digital voltmeter between CN1-7 and TP-GND. 2. Record in the TUNER mode, adjust R100 for 15.1 ± 0.1 V.

2.3 TIMER CIRCUIT

Note: Unless otherwise noted, all test points and adjustments are located on the TIMER board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Timer clock	TP2	C9	• E-E	1. Connect a frequency counter between TP2 and GND. 2. 8hort between GND and TP1 (TE8T), then short the leads of electrolytic capacitor C5 once in order to reset IC1. 3. Adjust C9 for 2048.000±0.002 Hz (488.2808 to 488.2818 μs).

2.4 SERVO CIRCUIT

Note: Unless otherwise specified, all test points and adjustments are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	PB Switching Point	VIDEO OUT or TP10	R445 (CH-1)	• PB • MH-1 Stairstep • Trigger slope (–) • SP mode	1. Connect an oscilloscope to VIDEO OUT or TP10 of the main board. 2. Play back the stairstep segment of MH-1 alignment tape. 3. Trigger the oscilloscope externally (– slope) with the signal from TP411 (DRUM FF). 4. Adjust R445 to position the trigger point 6.5 ± 0.5H from V. sync.
2	Slow Tracking	Monitor	R472	• Slow PB • SP mode	**Note:** Slow motion will start automatically after pressing the search button. 1. Set the tracking control of the FRONT to the center position by simultaneously pressing the + and – tracking buttons. 2. Record a color bar signal in the 8P mode, then play back in the Slow mode. 3. Adjust R472 to minimize noise bars in the monitor-TV display.
3	2X normal Tracking	Monitor	R410	• 2X Play • SP mode	1. Set the tracking control of the FRONT panel to the center position by simultaneously pressing the + and – tracking buttons. 2. Record a color bar signal in the SP mode, then playback in the 2X play mode. Adjust R410 to minimize noise bars in the monitor-TV display.
		Monitor	R408	• 2X Play • EP mode	3. In the same manner, adjust R408 for the EP mode.

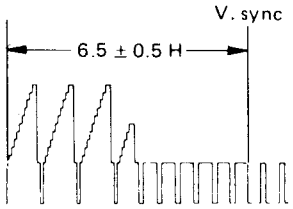
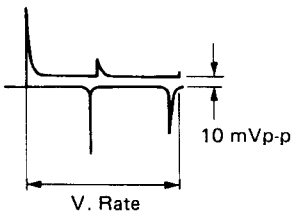


Fig. 2-2-1

2.5 VIDEO CIRCUIT

Note: Unless otherwise noted, all test points and adjustments are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	CCD bias-1	TP31	R3	• SP mode • E-E • Color bars • SOURCE SEL: AUX	**Note:** Confirm that the video signal level is 9.97 ± 0.05 Vp-p (75 Ω load) at VIDEO OUT. If necessary, perform the "E-E level" adjustment (Section 2.5.6) before this adjustment. 1. Connect an oscilloscope to TP10 and supply a color bar signal to VIDEO IN. 2. Adjust R3 for maximum output level.
2	CCD bias-2	TP32	R20	• SP mode • E-E • Color bars • SOURCE SEL: AUX	1. Connect an oscilloscope to TP32 and supply a color bar signal to VIDEO IN. 2. Adjust R20 for maximum output level.
3	Y NR (NC 8AL)	TP21	R28	• SP mode • E-E • Color bars • SOURCE SEL: AUX	1. Observe the TP21 waveform at V rate. 2. Adjust R28 for minimum DC step difference (less than 10 mVp-p)  **Fig. 2-5-1**
4	COL COM8	TP33	R40	• SP mode • E-E • Color bars • SOURCE SEL: AUX	1. Connect an oscillosocpe to TP33 and supply a color bar signal to VIDEO IN. 2. Adjust R40 so that the signal center-lines overlap each other (less than 50 mVp-p), in the SP mode.

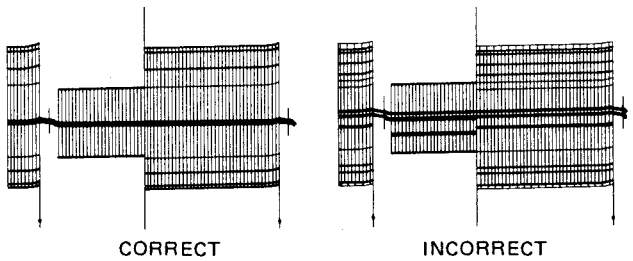
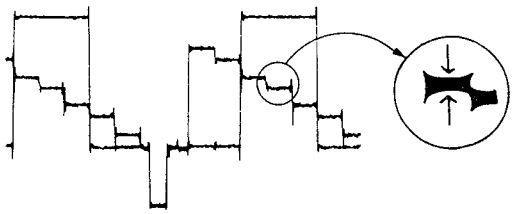
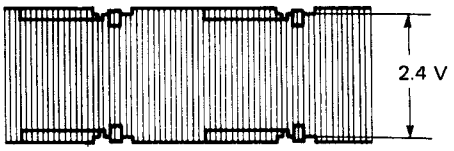


Fig. 2-5-2

Note: Unless otherwise noted, all test points and adjustments are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
5	Y COMB	TP30	R45 R48	• SP mode • E-E • Color bars • SOURCE SEL: AUX	1. Connect an oscilloscope to TP30 and apply a color bar signal to VIDEO IN. 2. Adjust R45 and R48 alternately for minimum chromatic level (less than 50 mVp-p) of the magenta portion.  Fig. 2-5-3
6	E-E level	VIDEO OUT or TP10	R204	• SP mode • E-E • Color bars • SOURCE SEL: AUX	1. Connect an oscilloscope to VIDEO OUT and supply a color bar signal to VIDEO IN. 2. Adjust R7 for 0.97 ± 0.05 Vp-p (75 Ω load).
7	REC FM level	TP3 (PRE/REC)	R109	• EP mode • REC • Color bars • SOURCE SEL: AUX	1. Connect an oscilloscope to TP3 of the PRE/REC board and record a color bar signal in the EP mode. 2. Adjust R109 for 2.4 Vp-p pedestal level between centers of the waveform outline at the pedestal portion.  Fig. 2-5-4

Note: Unless otherwise noted, all test points and adjustments are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
9	SP REC Color Level and Balance	TP307	R313	• PB mode • MH-1 color bar • SP mode • REC then PB • Color bar • SP mode	1. Connect an oscilloscope to TP307. Play back a color bar segment of the MH-1 and observe color signal level. 2. Adjust by pressing the + and – tracking buttons of the FRONT panel for maximum level of the color waveform and make a note of the higher color level. 3. Set the tracking control of the FRONT panel to the center position by simultaneously pressing the + and – tracking buttons. 4. Record and play back a color bar signal. If necessary, before recording, adjust R313 so that the higher level channel becomes 95 to 105% of the noted level during playback. At this time, confirm that the channel difference is within 5 dB.
10	EP REC Color Level and Balance	TP307	R314	• PB mode • MH-1L color bar • REC then PB • Color bar • EP mode	**Note:** Perform the EP mode adjustment after completing the SP mode. 1. Connect an oscilloscope to TP307. Play back a color bar segment of the MH-1L and observe color signal level. 2. Adjust by pressing the + and – tracking buttons of the FRONT panel for maximum level of the color waveform and make a note of the higher color level. 3. Set the tracking control of the FRONT panel to the center position by simultaneously pressing the + and – tracking buttons. 4. Record and play back a color bar signal. If necessary, before recording, adjust R314 so that the higher level channel becomes 95 to 105% of the noted level during playback. At this time, confirm that the channel difference is within 4 dB.
11	PB Y level	VIDEO OUT or TP10	R131	• SP mode • REC then PB • Color bars • SOURCE SEL: AUX	1. Connect an oscilloscope to VIDEO OUT. 2. Record a color bar signal in the SP mode, then play back. 3. Adjust R131 for 0.97 ± 0.05 Vp-p (75 Ω load).
12	C NR input level	TP325	R328	• SP mode • REC then PB • Color bars • SOURCE SEL: AUX	1. Observe the TP325 waveform at V rate. 2. Adjust R328 so that the color level (A) is 0.27 ± 0.01 Vp-p.

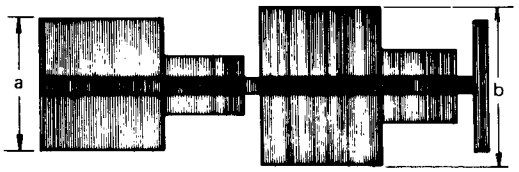


Fig. 2-5-5

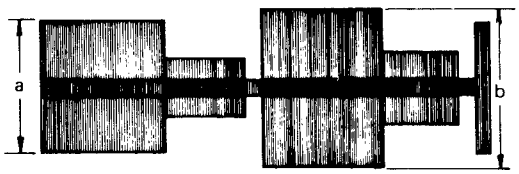


Fig. 2-5-6

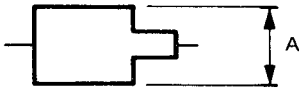
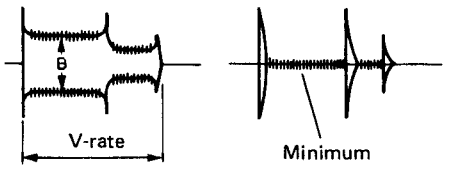


Fig. 2-5-7

Note: Unless otherwise noted, all test points and adjustments are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
13	C NR NC balance	TP324	R323 T302	• SP mode • PB • MH-1 color bars • EDIT: OFF	1. Observe the TP324 waveform at V rate. 2. Adjust R323 and T302 to minimize the 3.58 MHz level, i.e., so that only the noise component is observable as shown in Fig. 2-5-8. Note: R324 at nearly center position.  Fig. 2-5-8
14	C NR FB	TP324	R321	• SP mode • PB • MH-1 color bars • EDIT: OFF	1. Short TP21 to TP GND2. Use the controls of the oscilloscope to expand portion C of the TP324 waveform as shown in Fig. 2-5-9. 2. Adjust R321 so that the maximum 3.58 MHz amplitude D and waveform segment E are related as follows D : E = 2 : 1 ± 0.1 Note: Read p-p value of D and noise center of E.

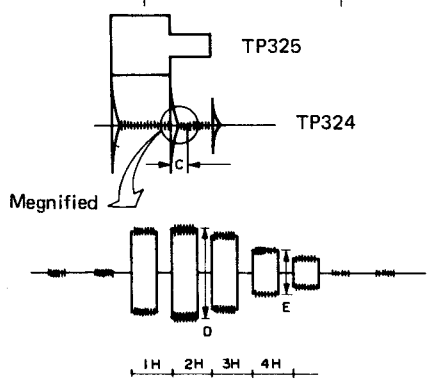


Fig. 2-5-9

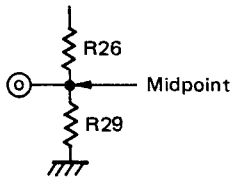
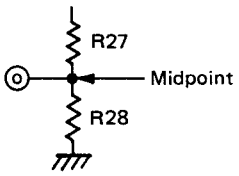
2.6 AUDIO CIRCUIT

Note: Unless otherwise specified, all test points and adjustments are located on the AUDIO board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Audio Bias Level	TP31, TP32	R9	• SOURCE Select: AUX • SP mode	1. Connect a millivoltmeter between TP31 and TP32. 2. Set for REC mode without signal. 3. Adjust R9 for 4 ± 0.2 mVrms.
2	Audio PB Level	AUDIO OUT	R28	• SOURCE Select: AUX • REC then PB • SP or EP mode	1. Connect an oscilloscope to AUDIO OUT. 2. Supply an audio signal (–8 dBs/1 kHz) to AUDIO IN and record together with a video signal, then play back. 3. Adjust R28 so that the audio output level during playback becomes –6 ± 2 dBs.
3	E-E Level	AUDIO OUT	R40 (CH1/L) R41 (CH2/R)	• SOURCE Select: AUX • ALC: OFF • E-E (Stop) mode • AUDIO OUT to Hi-Fi	1. Set the SOURCE SELECT switch to the AUX position. Supply a 1 kHz, –8 dBs audio signal to AUDIO IN and a VIDEO signal to VIDEO IN. 2. Set Hi-Fi REC level controls to center position. In the STOP (E-E) mode, adjust R40 to obtain –6 ± 0.5 dBs at AUDIO OUT. 3. In the same manner, adjust R41 for the R (CH2) channel.
4	Level Indicator	FDP (Level Ind.)	R30 (Indicator CH1/L) R35 (Indicator CH2/R)	• AUX • AUDIO OUT to Hi-Fi	**Note:** Perform the level indicator adjustment after completing the E-E level adjustment (section 2.6, No. 3). 1. Set the SOURCE SELECT switch to the AUX position. Supply a 1 kHz, –8 dBs audio signal AUDIO IN. 2. Set Hi-Fi REC level controls to detent position. In the E-E (STOP) mode, adjust R30 to the point where the FDP level indicators show 0 dB (all white LEDs light). 3. In the same manner, adjust R35 for the R (CH2) channel.

2.7 ON SCREEN CIRCUIT

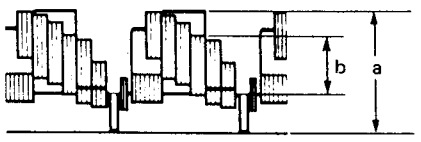
Note: Unless otherwise specified, all test points and adjustments are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Character Position	TP1 	C4	• E-E	**Note:** For below adjustments use 1 : 1 probe with input capacitance less than 100 pF. 1. Connect a frequency counter to TP1 (midpoint of R26 and R29) and GND. Short base of Q2 to ground (emitter) and short the leads of R25. 2. Adjust C4 for 8.7 ± 0.05 MHz without video signal.
2	Back ground Color	TP2 	C14	• E-E	1. Connect a frequency counter to TP2 (midpoint of R27 and R28) and GND. Adjust C14 for 7.15909 ± 0.0001 MHz.

2.S IF CIRCUIT

Note: Unless otherwise specified, all test points and adjustments are located on the IF board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	VCO	MONITOR	T2	• TV broadcast • Tuner mode	1. Receive a color broadcast on a VHF-HI channel (7 to 10). 2. Adjust T2 to obtain a fine picture on the monitor.
2	AFC	JP1-5	T3	• TV broadcast • Tuner mode • AFC SW: NORM	1. Receive a color broadcast on a VHF-HI channel (7 to 10). 2. With AFC SW to NORM, connect oscilloscope to pin 5 of JP1. 3. Set the oscilloscope to DC mode and adjust T3 to set the lower edge of the ripple waveform to 4.0 V.
3	Color Level	CN2 pin 3	R40	• TV broadcast • Tuner mode	1. Supply a color bar signal on a VHF-HI channel (7 to 10) from a TV channel signal generator and select the channel corresponding to the generator. 2. With AFC SW OFF, adjust R40 to produce signal waveform as shown in Fig. 2-5-1. **Alternate method:** 1. Receive a color broadcast on a VHF-HI channel (7 to 10). 2. With AFC SW OFF, adjust R40 so that the magenta level becomes 2/3% of the sync. level.
4	RF AGC	MONITOR	R21	• TV broadcast • Tuner mode	**Note:** Adjust R21 (RF AGC) to correct for excess noise in the picture or when streaky cross interference occurs due to strong electrical fields. 1. Adjust R21 to minimize noise or streaks on the TV screen. 2. Check for absence of abnormality on all channels.

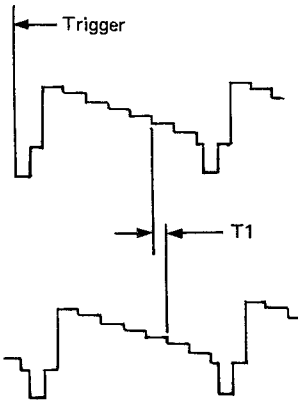
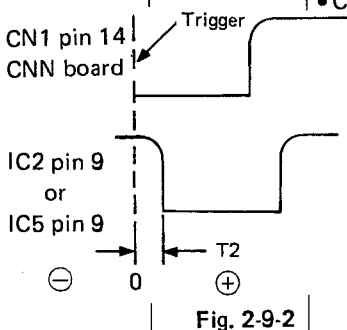


Y level = 1 a : b = 1 : 0.45
Megenta leval = 0.45

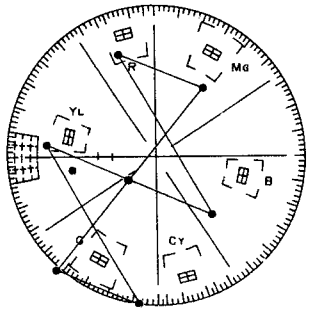
Fig. 2-8-1

2.9 DIGITAL CIRCUIT

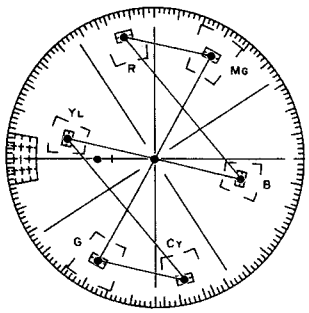
Note: Unless otherwise specified, all test points and adjustments are located on the DIGITAL board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Clock	CN1 pin 14 (Y IN) CN1 pin 10 (Y OUT) CNN board	R73	• E-E • Color bar	1. Supply a color bar signal to VIDEO IN, connect one channel of a dual trace oscilloscope to CN1 pin 14 of the CNN board and the other channel to CN1 pin 10 of the CNN board and observe the waveforms. Set the mode and time base of the oscilloscope to ALT mode and 10 μs/div. Trigger the oscilloscope internally (– slope). 2. Align the two waveforms as shown in Fig. 2-9-1 and adjust R73 to set T1 to less than 1 μsec.
		 Fig. 2-9-1			
2	AFC	CN1 pin 14 CNN board	R30	• E-E • Color bar	1. Supply a color bar signal to VIDEO IN, connect one channel of a dual trace oscilloscope to CN1 pin 14 of the CNN board and the other channel to IC2 pin 9 and observe the waveforms. 8et the mode and time base of the oscilloscope to ALT mode and 1 μsec/div. Trigger the oscilloscope internally (– slope). 2. Short IC2 pin 8 to IC2 pin 7 (SWD 5 V). Align the two waveforms (H. SYNC) as shown in Fig. 2-9-2 and adjust R30 to set T2 to less than $0 \begin{smallmatrix}-\\+\end{smallmatrix} \begin{smallmatrix}0\\0.25\end{smallmatrix}$ μsec.
		 Fig. 2-9-2			
			R66	• E-E • Color bar	3. In the same manner, connect the other channel of a dual trace oscilloscope to IC5 pin 9, and short IC2 pin 8 to IC2 pin 7 (SWD 5 V). Align the two waveforms (H. SYNC) as shown in Fig. 2-9-2 and adjust R66 to set T2 to less than 0.5 μsec.
3	VCXO	IC4 pin 21	C69 (VCXO)	• E-E • No signal	1. Connect a frequency counter to IC4 pin 21, set for the E-E mode without incoming signal. Adjust C69 for 3.579545 MHz ± 50 Hz.
		IC1 pin 18	C19 (VCXO)		2. Connect the frequency counter to IC1 pin 18, set for the E-E mode without incoming signal. Adjust C19 for 3.579545 MHz ± 50 Hz.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
4	Carrier Balance	VIDEO OUT	R37 (CARR. BAL.) R49 (CARR. BAL.)	• STROBE moda • Color bar	1. Supply a color bar signal to VIDEO IN, connect a vectorscope to VIDEO OUT via a TV-monitor and observe the pairs of color dots on the vectorscope. 2. Set for the STROBE mode, adjust R37 and R49 to observe the center of dot at the center of the display as shown in Fig. 2-9-3.
					• **Alternate method** 1. Supply a color bar signal to VIDEO IN, connect one channel of a dual trace oscilloscope to LPF1 pin 3 and the other channel to LPF2 pin 3. Set the mode of the oscilloscope to X-Y mode. 2. In the E-E mode, observe the pairs of color dots on the oscilloscope and TV-monitor color bar. 3. Set for the STROBE mode, alternately adjust R37 and R49 to align the pairs of color dots on the oscilloscope and TV-monitor color bar with that obtained in E-E mode. Note: Repeat the above steps (2 and 3) several times.
5	Burst Level	VIDEO OUT	R48 (BURST LEVEL)	• STROBE mode • Color bar	1. Supply a color bar signal to VIDEO IN, connect an oscilloscope to VIDEO OUT and observe the waveform on the oscilloscope. 2. Set for the STROBE mode, adjust R48 so that the burst level becomes 0.24 Vp-p.
6	Color Difference Balance, Color Level and Hue	VIDEO OUT	R20 (LEVEL) R23 (HUE) R36 (COLOR DIF.)	• STROBE mode • Color bar	1. Supply a color bar signal to VIDEO IN, connect a vectorscope to VIDEO OUT via a TV-monitor and observe the waveform on the vectorscope. 2. In the E-E mode, set the vectorscope for 75% color bar saturation as shown in Fig. 2-9-4. Set for the STRO8E mode and adjust R20, R23 and R36 to align the vectorscope waveform (Phase, Level to less than ±10%, 20%) with that obtained in the E-E mode.



Incorrect



Correct

Fig. 2-9-3

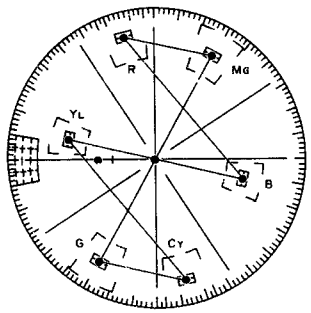
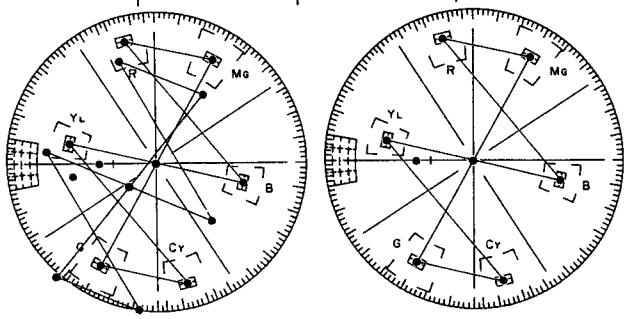


Fig. 2-9-4

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
			R20 (LEVEL) R23 (HUE) R36 (COLOR DIF.)		• **Alternate method** 1. Supply a color bar signal to VIDEO IN, connect one channel of a dual trace oscilloscope to LPF1 pin 3 and the other channel to LPF2 pin 3. Set the mode of the oscilloscope to X-Y mode. 2. In the E-E mode, observe the pairs of color dots on the oscilloscope and TV-monitor color bar. 3. Set for the STROBE mode, alternately adjust R20, R23 and R36 to align the pairs of color dots on the oscilloscope and TV-monitor color bar with that obtained in the E-E mode. **Note:** Repeat the above steps (2 and 3) several times.
7	Picture In Picture Hue (PIP)	VIDEO OUT	R59	• P IN P mode • Color bar • PB • MY-1 color bar	1. Supply a color bar signal to VIDEO IN, connect a vectorscope to VIDEO OUT via a TV-monitor and set the vectorscope for 75% color bar saturation as shown in Fig. 2-9-4. Play back the color bar segment of MH-1 alignment tape. 2. Set for the picture in picture mode, adjust R59 to align picture in picture phase as shown in Fig. 2-9-5.
					• **Alternate method** 1. Supply a color bar signal to VIDEO IN, observe the TV-monitor. 2. Play back the color bar segment of MH-1 alignment tape. Set for the picture in picture (PIP) mode, adjust R59 to align phase of inserted picture with main picture.



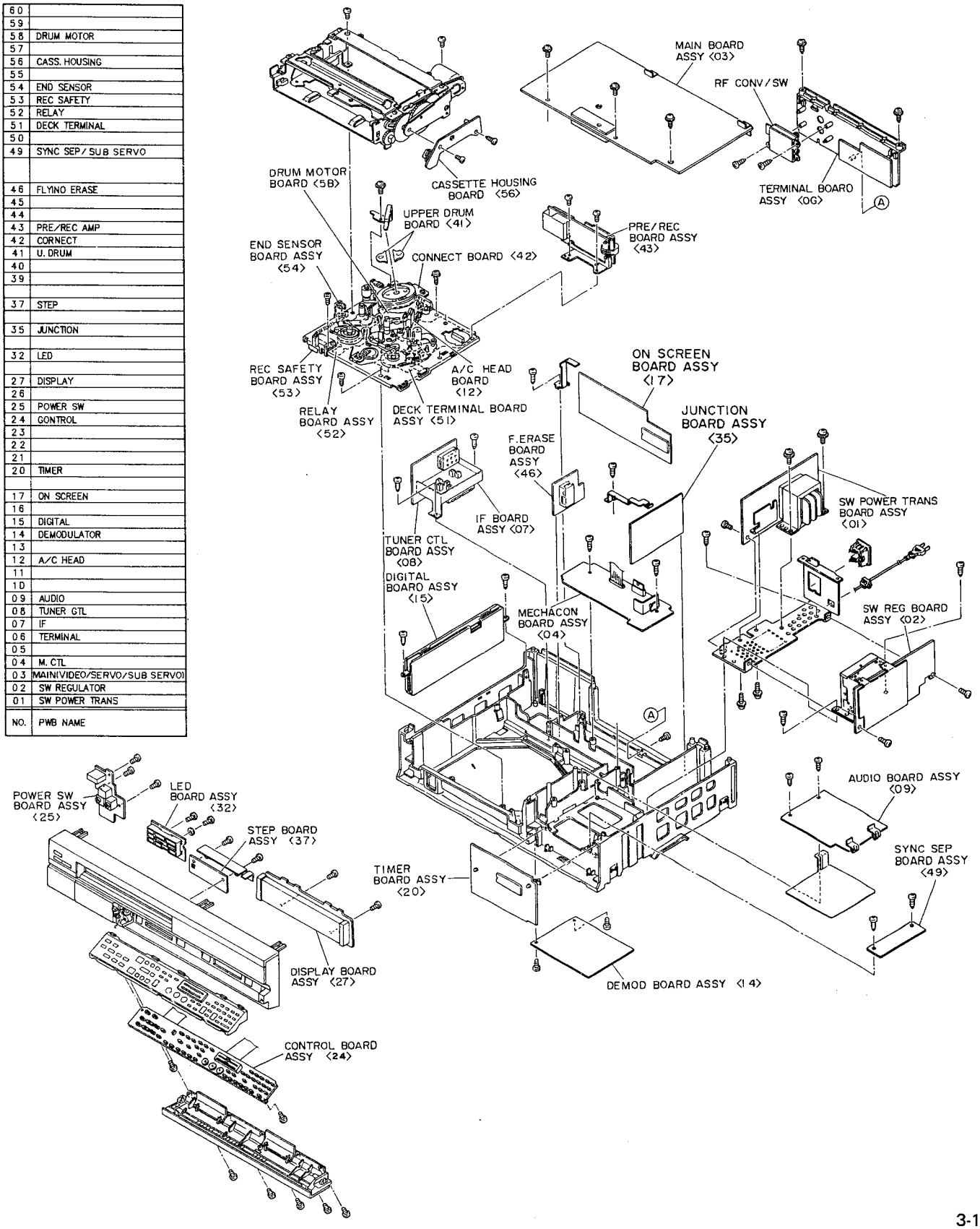
Incorrect Correct

Fig. 2-9-5

SECTION 3
CHARTS AND DIAGRAMS

3.1 CIRCUIT BOARD LOCATIONS

NO.	PWB NAME
60	
59	
58	DRUM MOTOR
57	
56	CASS. HOUSING
55	
54	END SENSOR
53	REC SAFETY
52	RELAY
51	DECK TERMINAL
50	
49	SYNC SEP/SUB SERVO
46	FLYING ERASE
45	
44	
43	PRE/REC AMP
42	CORNECT
41	U. DRUM
40	
39	
37	STEP
35	JUNCTION
32	LED
27	DISPLAY
26	
25	POWER SW
24	CONTROL
23	
22	
21	
20	TIMER
17	ON SCREEN
16	
15	DIGITAL
14	DEMODULATOR
13	
12	A/C HEAD
11	
10	
09	AUDIO
08	TUNER CTL
07	IF
06	TERMINAL
05	
04	M. CTL
03	MAIN/VIDEO/SERVO/SUB SERVO
02	SW REGULATOR
01	SW POWER TRANS



3.2 GENERAL INFORMATIONS

3.2.1 Connections

Note:
Unless otherwise specified, only signal input flow is indicated.
Connection arrows indicate only signal outputs.

: Connector

: Direct connection

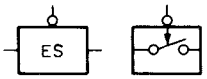
: Board in connector

: Connected pattern in the board.
Abbreviations
V : Video M : Mechacon
S : Servo A : Audio

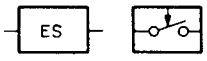
VS : Signal flow from video to servo.

3.2.2 Indications

AUX : Active only at high.
$\overline{AUX}$: Active only at low.
$\overline{AUX}$: Active only at middle.
$\overline{AUX}$: Active only at open.



: Active only at low for electronic switch.



: Active only at high for electronic switch.

: Low pass filter.

: High pass fiiter.

: Band pass filter.

: Limiter.

: Detector

: Amplifier.

: Mixer stage.

3.2.3 Schematic diagram values

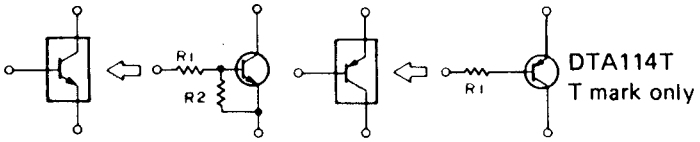
Unless otherwise specified.
1. All resistance values are in ohms, 1/6 W, 1/8 W, (refer to parts list).
2. All capacitance values are in μF, (P; PF).
3. All inductance values are in μH, (m; mH).
4. All diodes are 1SS133 or MA165, (refer to parts list).
5. Voltages are DC-measured (reference to ground) with a digital voltmeter during recording (SP mode) and playback (SP mode) with alignment tape. Where voltages differ between recording and playback, the voltage during playback is shown in parentheses.
6. Waveforms (VIDEO System) are measured (reference to ground) with a color bar during recording (SP mode) and playback (SP mode) with alignment tape.
7. Waveforms (AUDIO System) are measured (reference to ground) with 1 kHz (−8 dBs) during recording and playback with alignment tape (1 kHz).
8. Shaded (▒▒) parts are critical for safety. Replace only with specified parts numbers.

3.2.4 Signal flow in the schematic

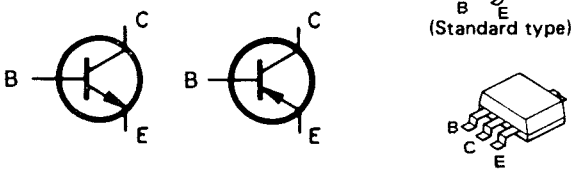
Recording signal path
Playback signal path
REC/PB signal path

3.2.5 Semiconductors

1. Digital transistor

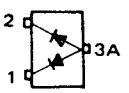


2. Chip transistor

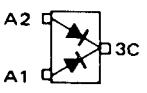


3. Chip diode

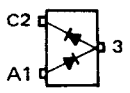
DAN202U
MA151WA
MA141WA

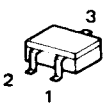


MA141WK
MA151WK
DAN202K



DA204K





Note:
The digital transistor includes built in resistors.
It features small size and high reliability.
Both PNP and NPN types are available.

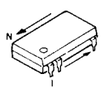
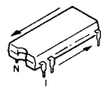
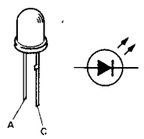
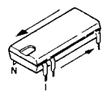
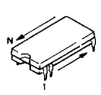
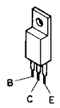
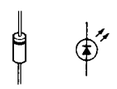
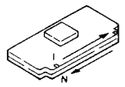
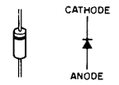
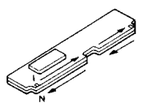
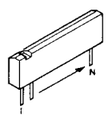
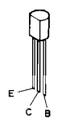
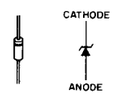
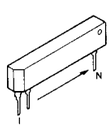
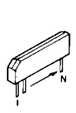
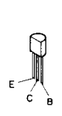
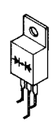
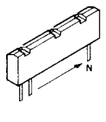
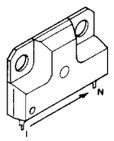
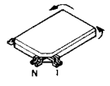
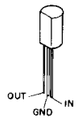
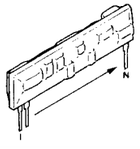
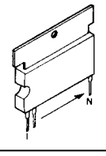
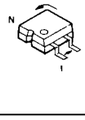
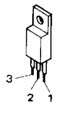
Uses:
Inverter, Interface, driver circuits.

3.3 ABBREVIATIONS USED IN THE SCHEMATIC DIAGRAMS

A	AC	: Alternating Current
	ACC	: Automatic Color Control
	ACCEL	: Acceleration
	A/CTL	: Audio/Control
	ADC	: Analog to Digital Converter
	ADD	: Adder
	ADRS	: Address
	ADJ	: Adjustment
	A DUB	: Audio Dubbing
	AE	: Audio Erase
	AEF	: Automatic Editing Function
	AFC	: Automatic Frequency Control
	AFT	: Automatic Fine Tuning
	AGC	: Automatic Gain Control
	AH	: Audio Head
	AL	: After Loading
	ALC	: Automatic Light Compensation Automatic Level Control
	AM	: Amplitude Modulation
	AMP	: Amplifier
	ANT	: Antenna
	APC	: Automatic Pedestal Control Automatic Phase Control
	APL	: Average Picture Level
	A/S/M	: Audio/Servo/Mechacon
	ASS'Y	: Assembly
	ATT	: Attenuator
	AUD	: Audio
	AUTO	: Automatic
	AUX	: Auxiliary
B	B	: Base
	BAL	: Balance
	BATT	: Battery
	BFP	: Burst Flag Pulse
	BIT	: Binary Digit
	BLK	: Black, Blanking
	BLU	: Blue
	BILING	: Bilingual
	BPF	: Bandpass Filter
	BRK	: Brake
	BRN	: Brown
	BT	: Band Tuning
	BUFF	: Buffer
	BW or B/W	: Black and White
C	C	: Capacitance, Collector, Color
	CAP	: Capstan, Capacitor
	CAR	: Carrier
	CARR	: Carrier
	CASS	: Cassette
	CCD	: Charge Coupled Device
	CCT	: Circuit
	CD	: Count Down
	CE	: Chip Enable
	CF	: Ceramic Filter
	CH	: Channel
	CHG	: Charge
	CHROMA	: Chrominance
	CLK	: Clock
	CLR	: Clear
	CMD	: Command
	CNT	: Count, Counter
	COL	: Color
	COM	: Common
	COMB	: Combination Comb Filter
	COMP	: Comparator Composite Compensation
	CONN	: Connector
	CONV	: Converter
	CP	: Circuit Protector Clamp Pulse
	CPC	: Capstan Phase Control
	CTL	: Control
D	D	: Drum, Digital, Diode, Drain
	DAC	: Digital to Analog Converter
	dB	: Decibel
	DC	: Direct Current
	DEC	: Decoder
	DEMOD	: Demodulator
	DEMUX	: Demultiplexer
	DET	: Detector
	DEV	: Deviation
	DIF	: Differential
	DISCR	: Discriminator
	DL	: Delay Line
	DOC	: Dropout Compensator
	DOD	: Drop Out Detector
	DPC	: Drum Phase Control
E	E	: Edit, Emitter
	E-E	: Electric to Electric
	EF	: Emitter-Follower
	EMP	: Emphasis
	EN	: Enable
	ENC	: Encoder
	ENV	: Envelope
	EP	: Extended Play
	EQ	: Equalizer
	ES	: Electronic Switch
	ESNS	: End Sensor
	EXP	: Expander
	EXT	: External
F	F	: Farad, Fuse
	F ADV	: Frame Advance
	FDP	: Fluorescent Display Panel
	FE	: Full Erase
	FET	: Field Effect Transistor
	FF	: Fast Forward Flipflop
	FG	: Frequency Generator
	FM	: Frequency Modulation
	FMA	: FM Audio
	FR	: Full Recording, Frame, Fusible Resistor
	FREQ	: Frequency
	F-V CONV	: Frequency to Voltage Converter
	FWD	: Forward
	FWD S	: Forward Search
G	G	: Green, Gate, Grid
	GEN	: Generator
	GND	: Ground
	GRN	: Green
	GRY	: Gray
H	H	: High, Henry, Hour
	HG	: Hall Generator
	HPF	: Highpass Filter
	Hz	: Herz
I	IC	: Integrated Circuit
	ID	: Identification (Pulse)
	IF	: Intermediate Frequency
	IFR	: Infrared
	IFT	: Intermediate Frequency Transformer
	IND	: Indicator
	INH	: Inhibit
	INS	: Insert
	INT	: Internal, Interrupt
	INV	: Inverter
	I/O	: Input/Output
	IR	: Infrared
L	L	: Low, Left
	LIM	: Limiter
	LIN	: Linearity
	LOAD	: Loading (Cassette)
	LP	: Long Play
	LPF	: Lowpass Filter

M	M	: Motor, Mega
	MAX	: Maximum
	MDA	: Motor Drive Amplifier
	MECHACON	: Mechanism Control
	MI	: Multiintroduce
	MIC	: Microphone
	MIN	: Minimum
	MIX	: Mixer, Mixing
	MMV	: Monostable Multivibrator
	MOD	: Modulation, Modulator
	MODEM	: Modulator-Demodulator
	MON	: Monitor
	MPX	: Multiplexer, Multiplex
	MS	: Mode Select
N	NAND	: Not-And
	NC	: Not Connected, Normally Closed
	NFB	: Negative Feedback
	NLN	: Non-Linear
	NO	: Normally Open
	NOR	: Normal, Not-Or
	NR	: Noise Reduction
O	OP	: Operation
	OPAMP	: Operational Amplifier
	ORN	: Orange
	OSC	: Oscillator
P	PB	: Playback
	PC	: Photocoupler, Pulse Counter
	PCM	: Pulse Code Modulation
	PG	: Pulse Generator
	PGM	: Program
	PI	: Photo Interrupter
	PIF	: Picture Intermediate Frequency
	PLA	: Programmable Logic Array
	PLL	: Phase Locked Loop
	POS	: Position
	p-p	: Peak-to-Peak
	PREAMP	: Preamplifier
	P/S	: Pause/Still
	PSC	: Pulse Swallowing Control
	PU	: Pickup
	PUT	: Programmable Unijunction Transistor
	PWM	: Pulse Width Modulation
	PWR	: Power
Q	Q	: Quality Factor
R	R	: Red, Right
	RA	: Resistor Array
	RAE	: Random Access Enable
	RAM	: Random Access Memory
	REC	: Recording
	REF	: Reference
	REG	: Regulated, Regulator
	REM	: Remote
	REMOCON	: Remote Control (Unit)
	REV	: Reverse
	REV S	: Reverse Search
	REW	: Rewind
	R/P	: Record/Playback
	RPT	: Repeat
	RST	: Reset
	RT	: Rotary Transformer
	RUN	: Running
	RY	: Relay
S	SAW	: Sawtooth, Surface Acoustic Wave
	SC	: Subcarrier, Simulcast
	SCH	: Search
	SEL	: Select, Selector
	SENS	: Sensor
	SEP	: Separator
	SF	: Source Follower
	SFF	: Short Fast Forward
	SIF	: Sound Intermediate Frequency
	SHARP	: Sharpness
	SN	: Signal to Noise Ratio
	SOL	: Solenoid
	SP	: Standard Play
	SREV	: Search Reverse
	SREW	: Short Rewind
	S/S	: Slow/Still
	SSG	: Sync Signal Generator
	SSNS	: Start Sensor
	STD	: Strobe Data, Standard
	SUP	: Supply
	SW	: Switch
	SWD	: Switched
	SYNC	: Synchronization
T	TF	: Thermal Fuse
	TIM	: Timing
	TK	: Tracking
	TNR	: Tuner
	TP	: Test Point
	TPZD	: Trapezoid
	TR	: Transistor, Trimmer
	TRANS	: Transformer
	TU	: Take-up
U	UL	: Unloading
	UNREG	: Unregulated
	UNSW	: Unswitched
V	V	: Vertical, Volt
	VCO	: Voltage Controlled Oscillator
	VD	: Vertical Drive
	VIF	: Video Intermediate Frequency
	VLT	: Violet
	VR	: Variable Resistor
	VS	: Video and Sync
	V/T	: Video/Television
	V/U	: VHF/UHF
	VXO	: Variable Crystal Oscillator
W	W	: Watt
	W & D	: White and Dark
	WHT	: White
X	XTAL	: Crystal
Y	Y	: Luminance
	YEL	: Yellow

3.4 MAIN TYPES OF ACTIVE AND PACKAGE CIRCUITS

	Integrated Circuit		Transistor		Diode
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					

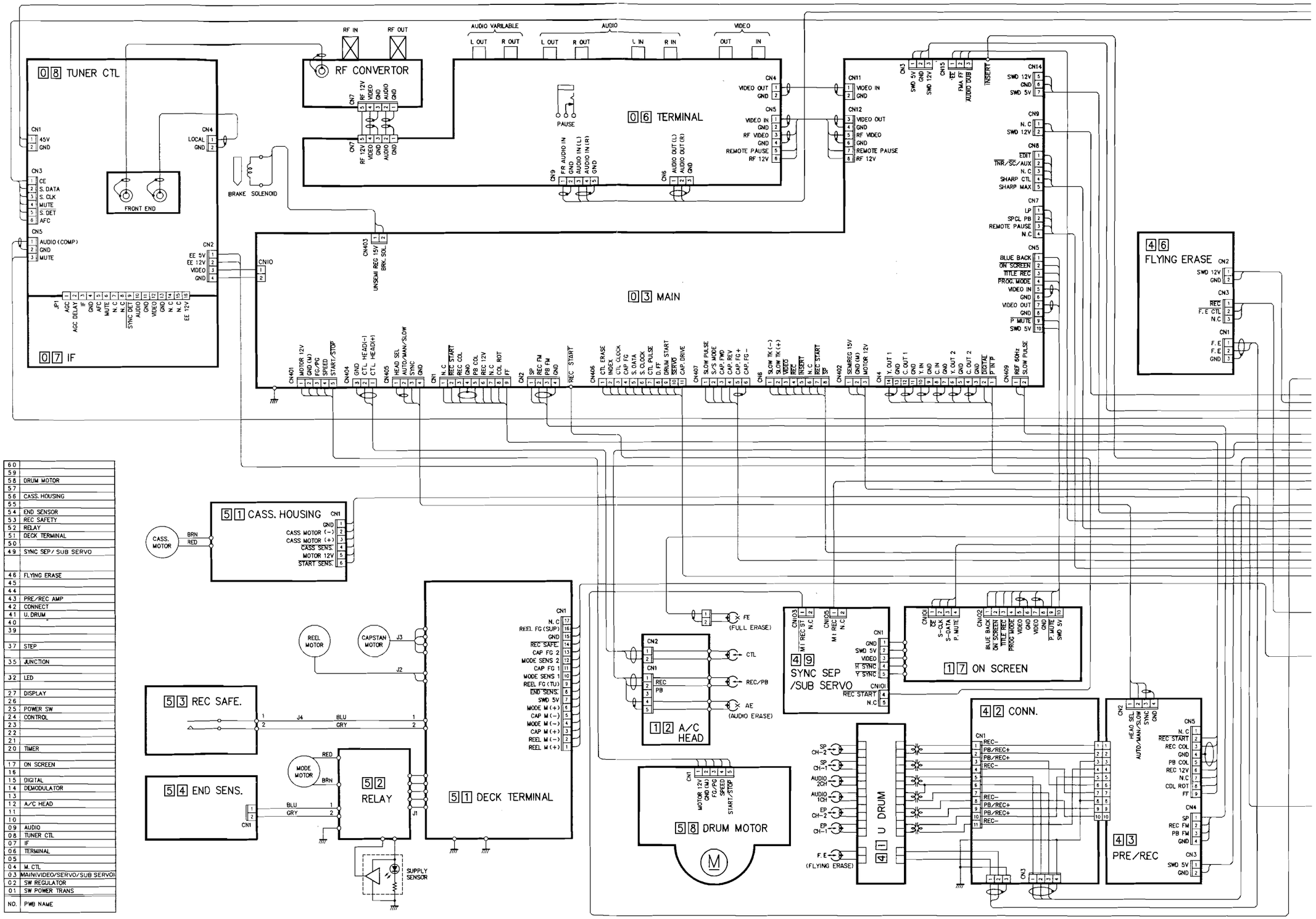
	NAME	L
A	AN3211NK	1B
	AN3380NK	1B
	AN6392	5A
B	BA6222	9A
	BA6259N	6A
	BA7021	4B
	BA7233	2A
	BU2767S	2A
	BU4013B	2A
	BU4030B	2A
	BU4030BF	8B
C	CXA1011P	1A
	CX20112	2A
H	HA118019NT	2B
	HD49712ANT	1A
L	LA7220	1B
M	M5M4C500L	5B
	M5218P	3A
	M50255P	2A
	M50747E-898FP	7A
	M50938-610SP	2B
	M51271FP	8B
	M51272FP	8B
	M51279FP	8B
	M51365SP	1B
	M51647SP	1B
	M52678FP	8B
	M52679FP	8B
	M5239L	5B
	M50925-616SP	1B
	M50959-613SP	2A
	M58658P	2A
	MSC1124BRS	2A
	MSC7110-01SS	1A
	M54647L	6B
	M65011FP	7A
	MB89010A-108	2A
	MN3106	3A
	MN3801	1B
N	NJM2217L	2A
	NJM2220S	5B
P	PB20166D	3B
	PB20167B-02	3B
	PU22517C	3B
U	UPC7805H	9C
	UPC319C	1B
	UPC393C	3A
	UPD74HC00G	8B
T	TA7361AP	5A
	TC74HC4053AF	9B
	TD6358P	1B
	TD62003F	8B
S	S-8053HLB	7B

	NAME	L
DTA	DTA114ES	4C
	DTA114EF	3D
	DTA124EK	1C
	DTA124ES	4C
	DTA144WS	2C
	DTA144ES	4C
DTB	DTB114ES	4D
DTC	DTC143ES	4C
	DTC143TS	3D
	DTC144EF	2C
	DTC144EK	1C
	DTC144ES	4C
	DTC144WS	4C
DTD	DTD114ES	3D
U	UN4112	2C
	UN4319VI	
2SA	2SA854S	4C
	2SA933S	4C
	2SA1037K	1C
	2SA1039	4C
	2SA1039S	4C
	2SA1346	4C
2SB	2SB1068	4D
	2SB1186	2D
2SC	2SC536SPA	4C
	2SC1685	5C
	2SC1740S	4C
	2SC1741S	4C
	2SC2021	2C
	2SC2412K	1C
	2SC3311	4C
	2SC2655	4D
	2SC3243DE	4D
	2SC3354	2C
	2SC3399	4C
	2SC3400	4C
2SD	2SD636	2C
	2SD1423	4C
	2SD1450	4C
	2SD1468S	4C
	2SD1764	2D
	2SD1796	2D

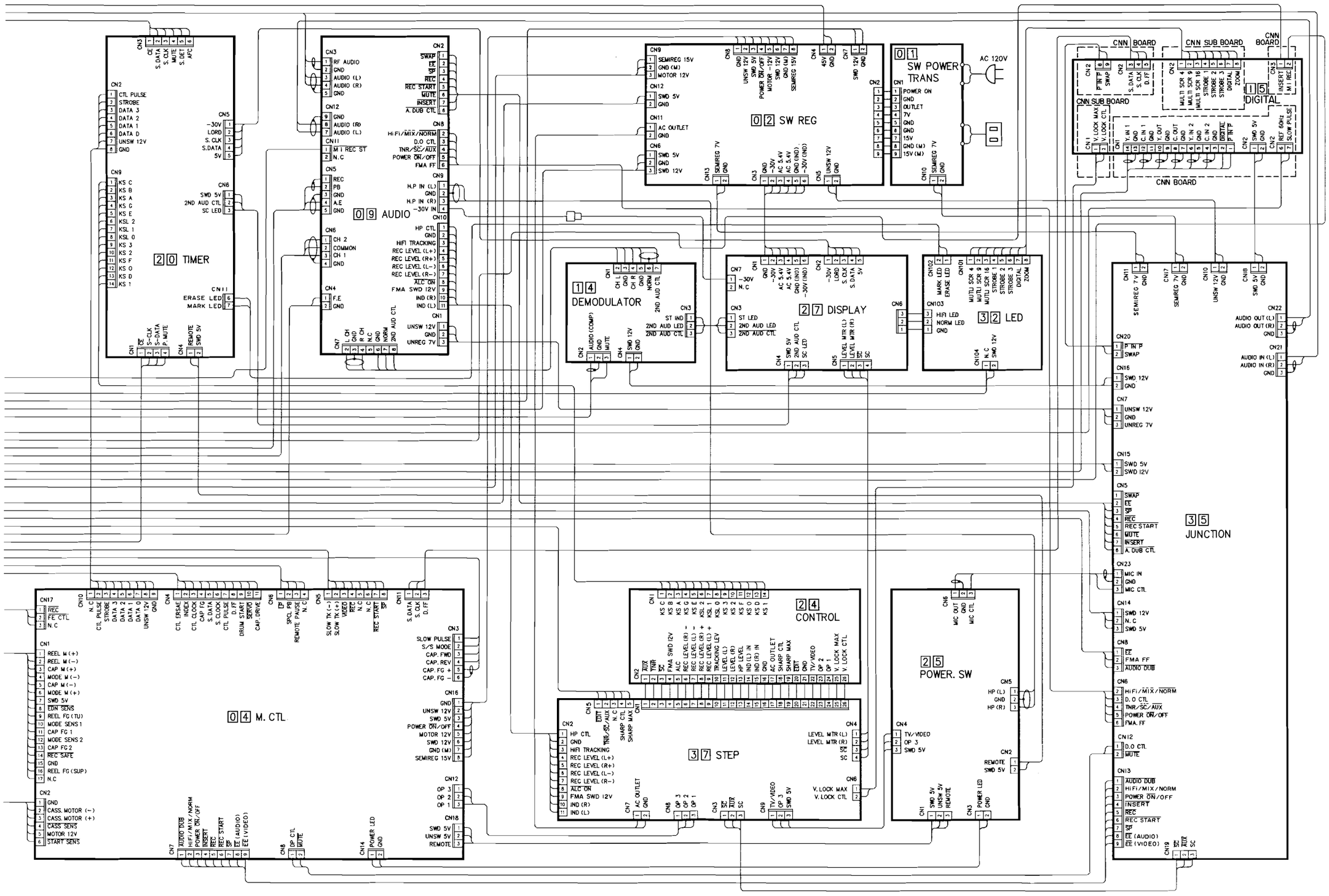
	NAME	L
A	AU01Z	3E
D	DAN202K	3E
F	F5KQ40B	5E
	F6P20F	5E
	FMB-24	5E
	FML-12S	5E
H	HZ2BLL	4E
	HZ30-2	4E
	HZS4.3EB2	4E
	HZS33EB1	4E
	HSS101-01	3E
	HZS7.5EB2	4E
L	LTZ-MR15	2E
M	MA27W(B)	3E
	MA165	3E
	MTZ4.3A	4E
	MTZ6.8B	4E
	MTZ7.5C	4E
	MTZ10A	4E
	MTZ10B	4E
	MTZ13C	4E
	MTZ20C	4E
	MTZ9.1C	4E
O	OA90	3E
R	RD3.0ES-TIB2	4E
	RD5.6ES-TIB3	4E
	RD24ES-TIB2	4E
	RD8.2ESB2	4E
	RD9.1ES-TIB2	4E
	RU1A	3E
S	SLH-34VC3F	1E
	SLV-31MC3F	1E
U	UZ8.2BSC	4E
1	10E4	3E
	11E2	3E
	1SS99	3E
	1SS101	3E
	1SS132	3E
	1SS133	3E
	1SS136	
E	E-452-2	4E

Note: For instance, AN3211NK → 1B : See column 1, line B

3.5 BOARD INTERCONNECTIONS

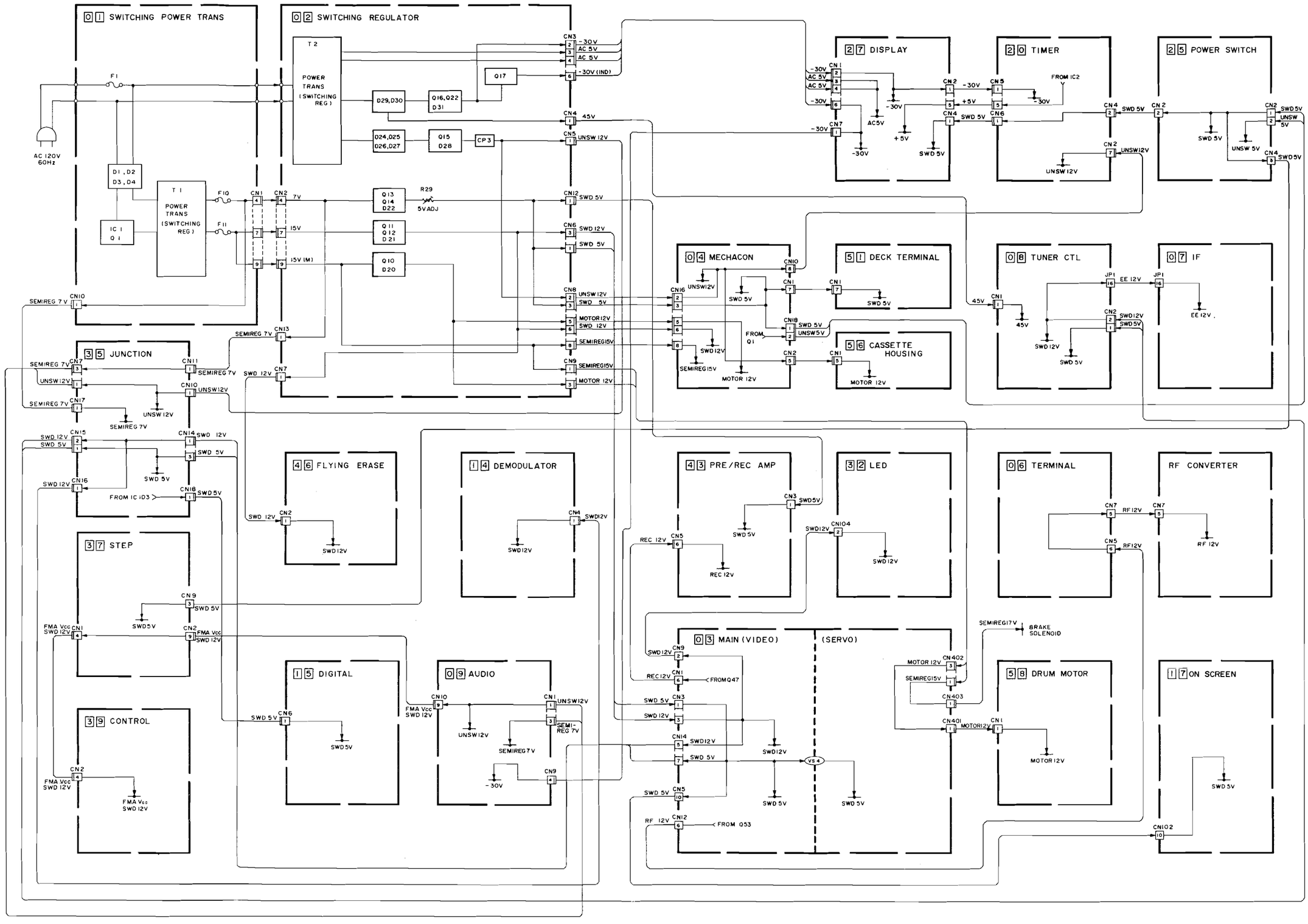


60	
59	
58	DRUM MOTOR
57	
56	CASS. HOUSING
55	
54	END SENSOR
53	REC SAFETY
52	RELAY
51	DECK TERMINAL
50	
49	SYNC SEP/ SUB SERVO
46	FLYING ERASE
45	
44	
43	PRE/REC AMP
42	CONNECT
41	U. DRUM
40	
39	
37	STEP
35	JUNCTION
32	LED
27	DISPLAY
26	
25	POWER SW
24	CONTROL
23	
22	
21	
20	TIMER
17	ON SCREEN
16	
15	DIGITAL
14	DEMODULATOR
13	
12	A/C HEAD
11	
10	
09	AUDIO
08	TUNER CTL
07	IF
06	TERMINAL
05	
04	M. CTL
03	MAIN(VIDEO/SERVO/SUB SERVO)
02	SW REGULATOR
01	SW POWER TRANS
NO.	PWB NAME

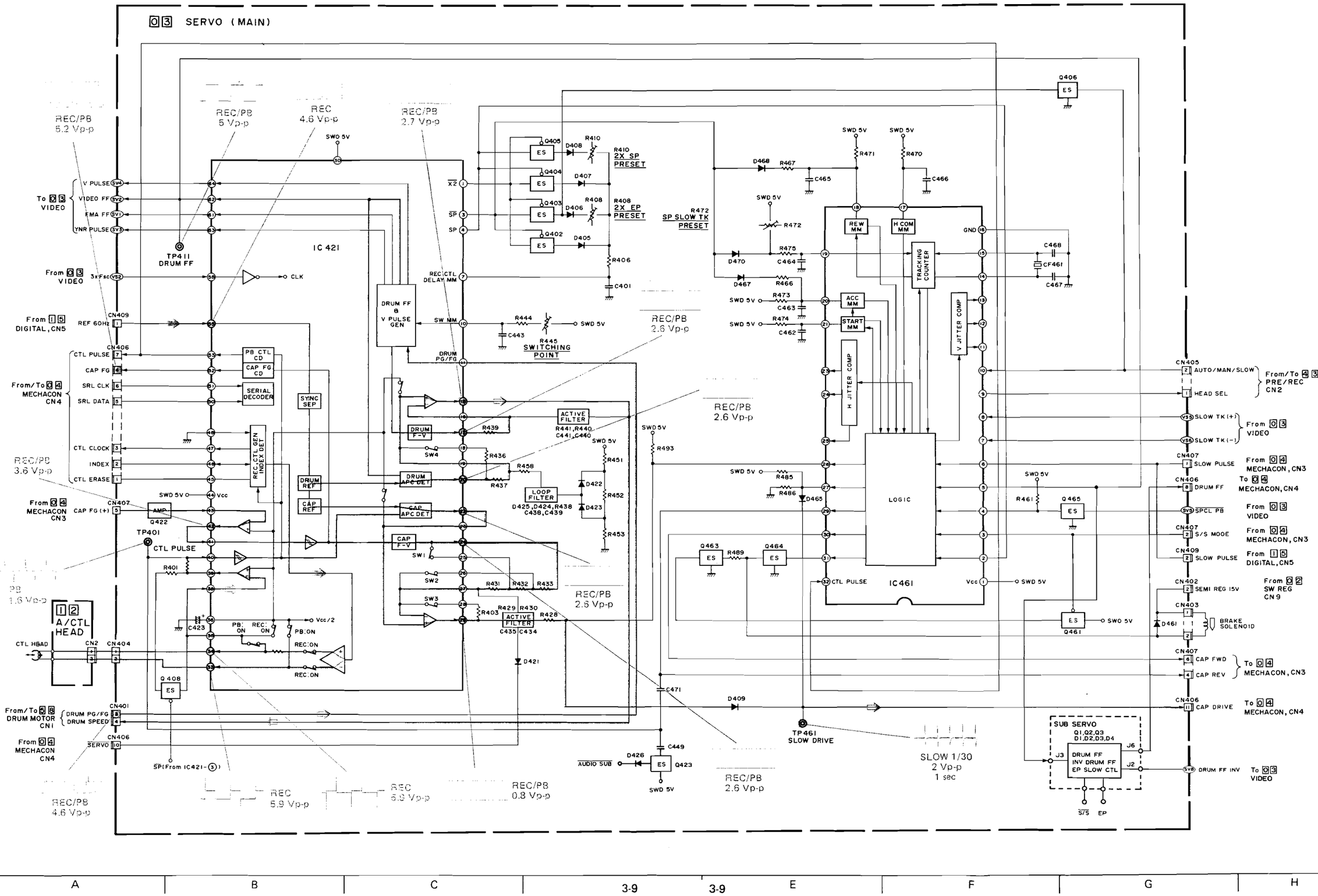


I J K L 3-7 3-7 N O P

3.6 POWER SYSTEM BLOCK DIAGRAM

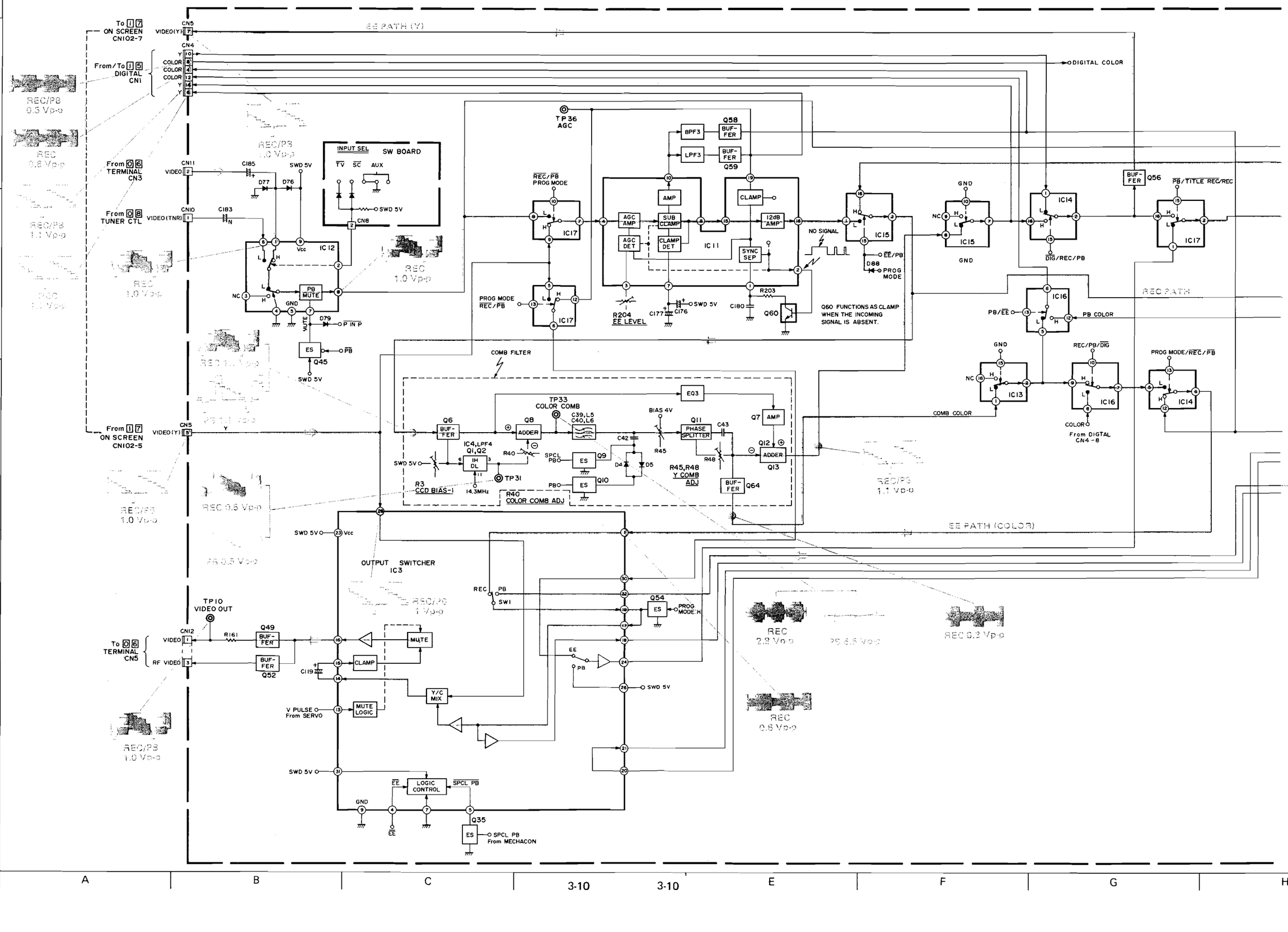


3.7 SERVO BLOCK DIAGRAM



A B C 3-9 3-9 E F G H

3.8 VIDEO BLOCK DIAGRAM



A B C 3-10 3-10 E F G H

1 2 3 4 5 6

03 MAIN (VIDEO/SERVO)

IC1 N-VHS

DOUBLE LIMITER CIRCUIT

YNR CIRCUIT

IC301 COLOR

REC PATH

PB PATH

REC/PB 0.37 Vp-p

REC 1.6 Vp-p

PB 0.3 Vp-p

REC/PB 0.3 Vp-p

REC 0.24 Vp-p
PB 0.14 Vp-p

PB 0.22 Vp-p

PB 90 mVp-p

REC 20 mVp-p

PB 0.32 Vp-p

PB 0.41 Vp-p

REC/PB 4.3 Vp-p

REC 0.64 Vp-p

PB 0.44 Vp-p

REC 130 mVp-p

PB 0.18 Vp-p

REC/PB 0.37 Vp-p

REC 1 Vp-p

REC/PB 0.37 Vp-p

REC 0.32 Vp-p

PB 0.32 Vp-p

REC 0.64 Vp-p

PB 0.41 Vp-p

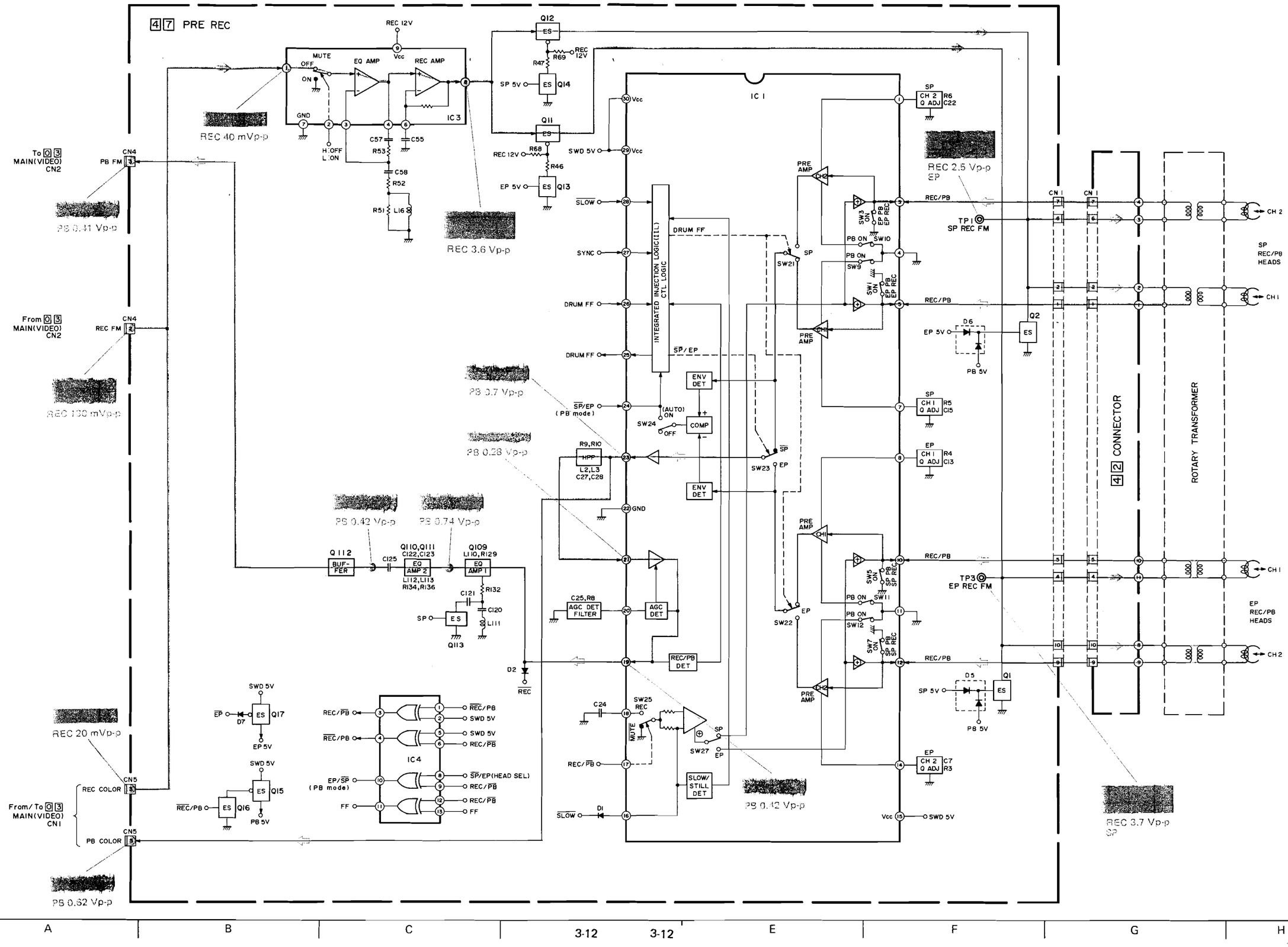
REC 0.64 Vp-p

PB 0.41 Vp-p

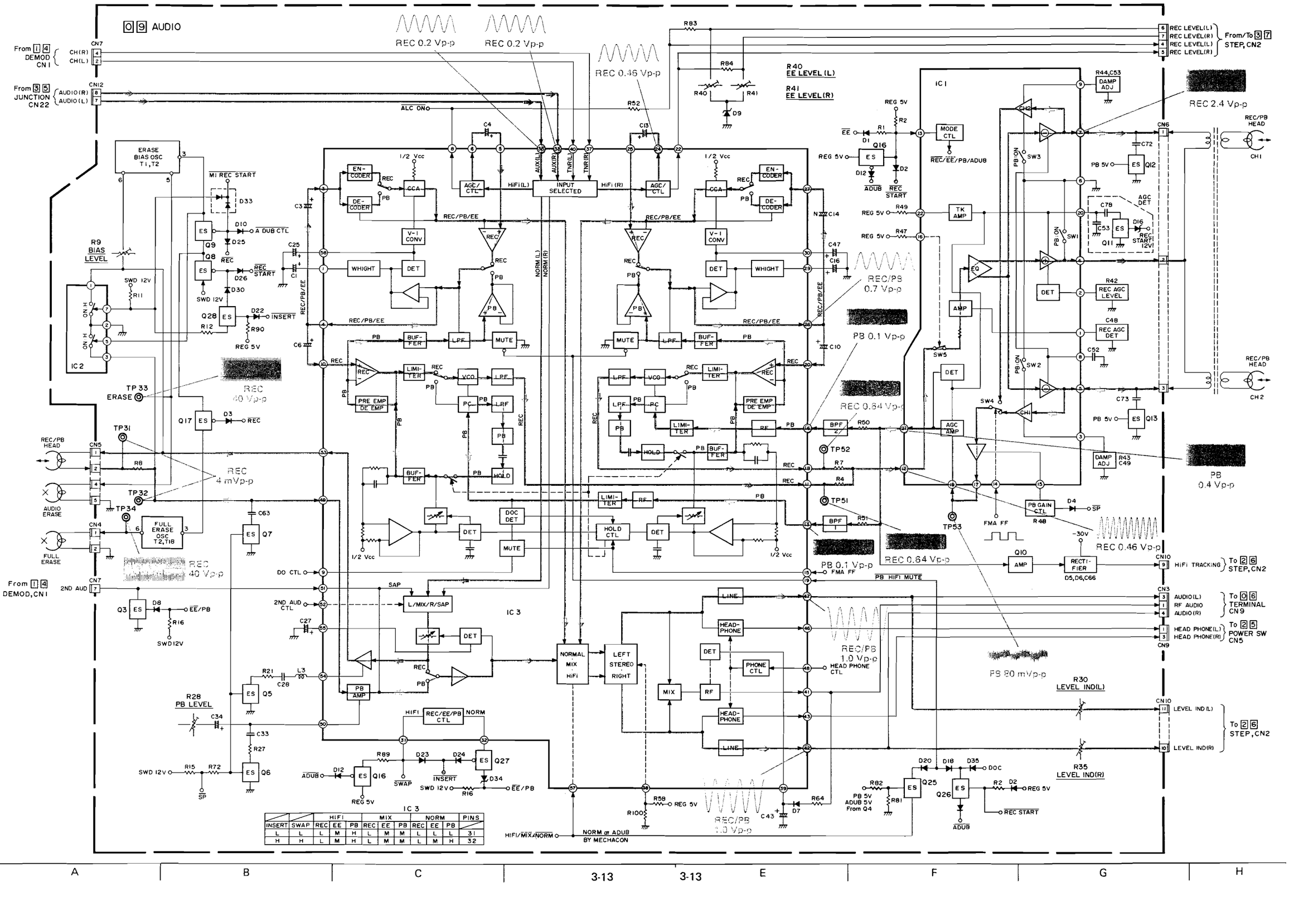
REC 0.64 Vp-p

PB 0.41

3.9 PREREC BLOCK DIAGRAM

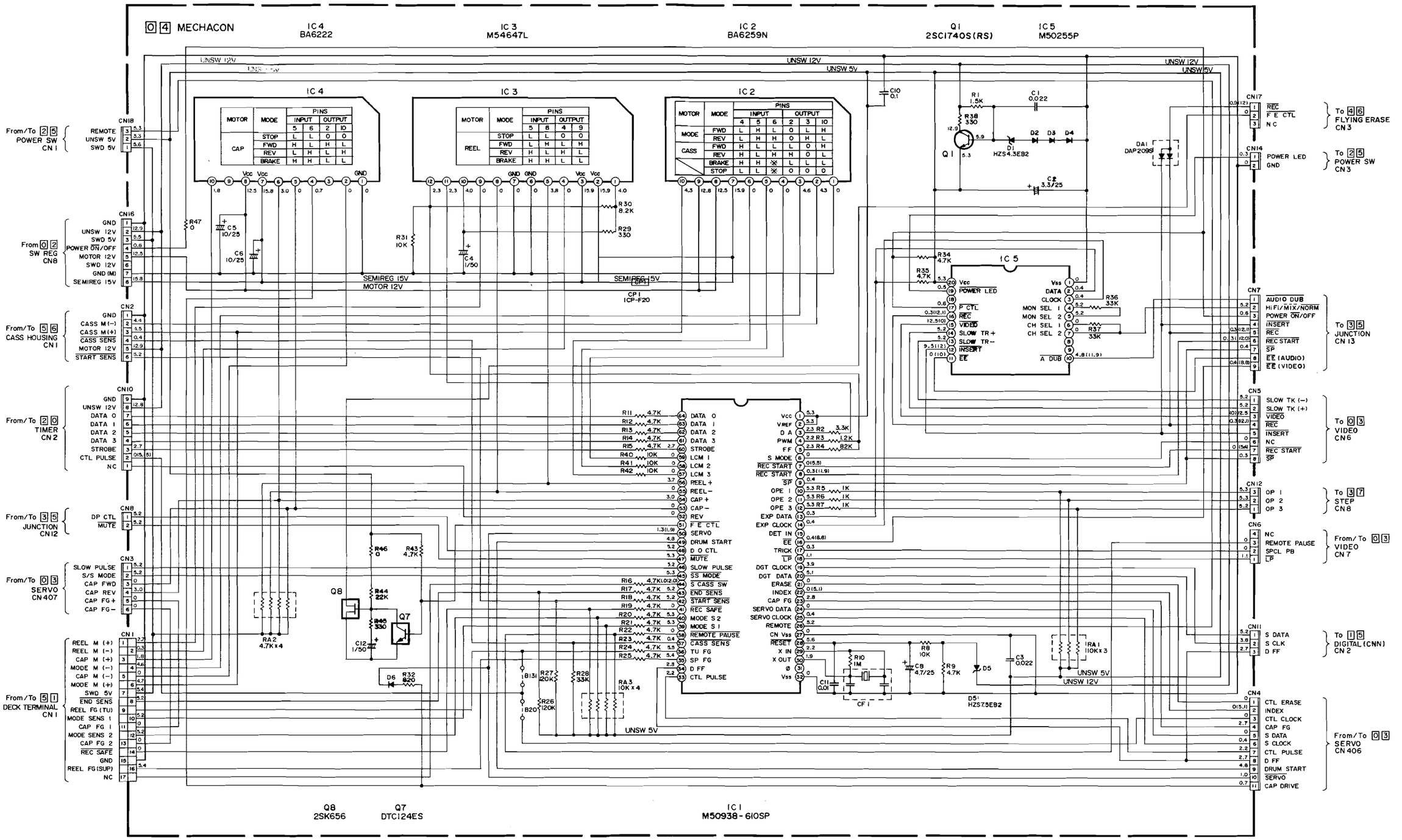


3.10 AUDIO BLOCK DIAGRAM

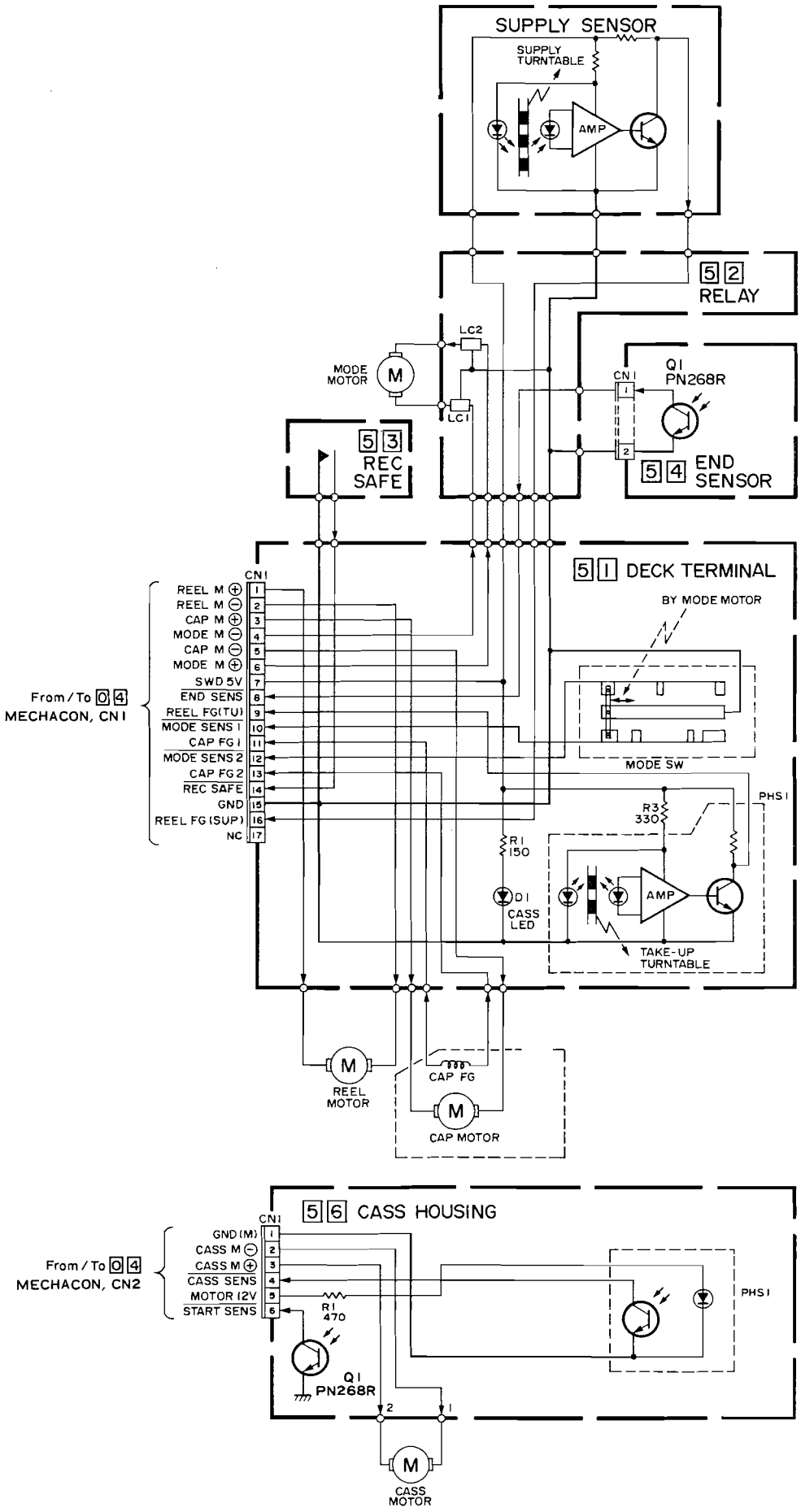


3-13 3-13

3.11 MECHANISM CONTROL SCHEMATIC DIAGRAM

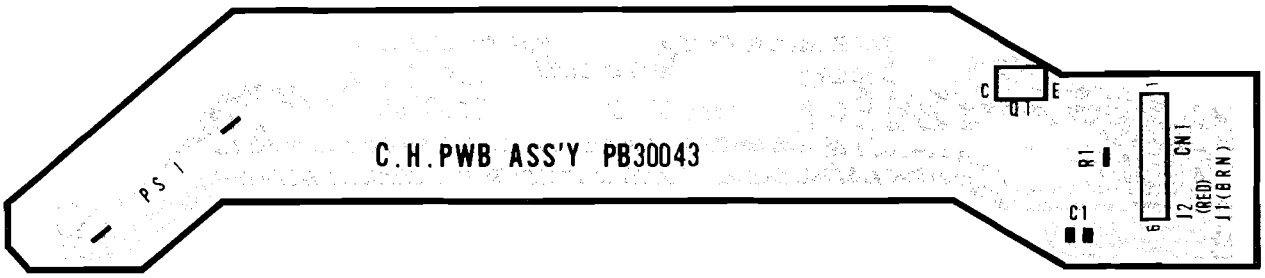


3.12 DECK TERMINAL SCHEMATIC DIAGRAM

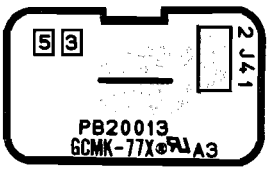


3.13 MECHANISM CONTROL AND DECK TERMINAL CIRCUIT BOARDS

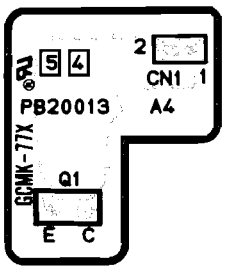
– CASSETTE HOUSING –



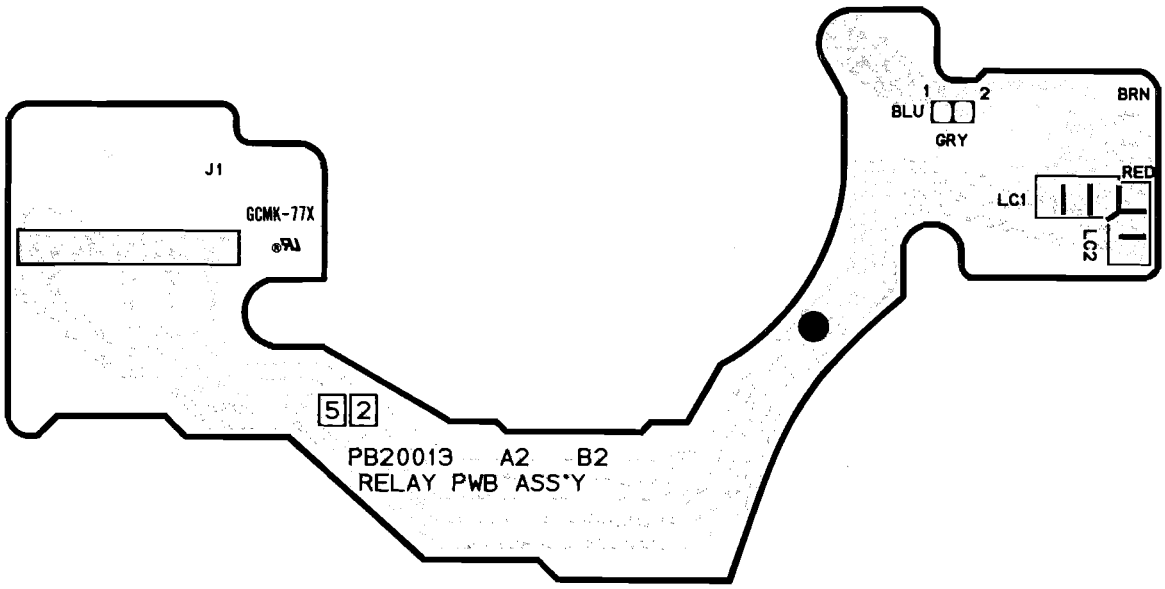
– REC SAFETY –



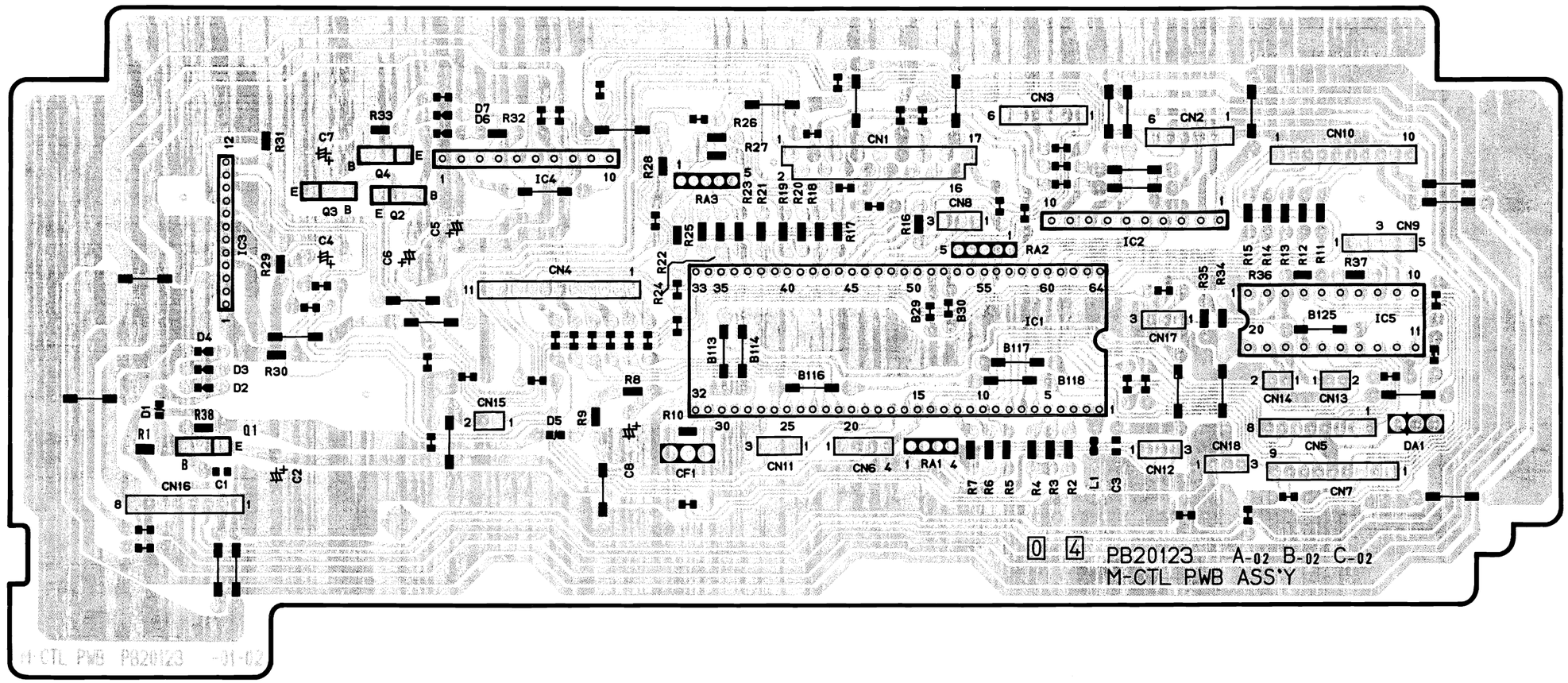
– END SENSOR –



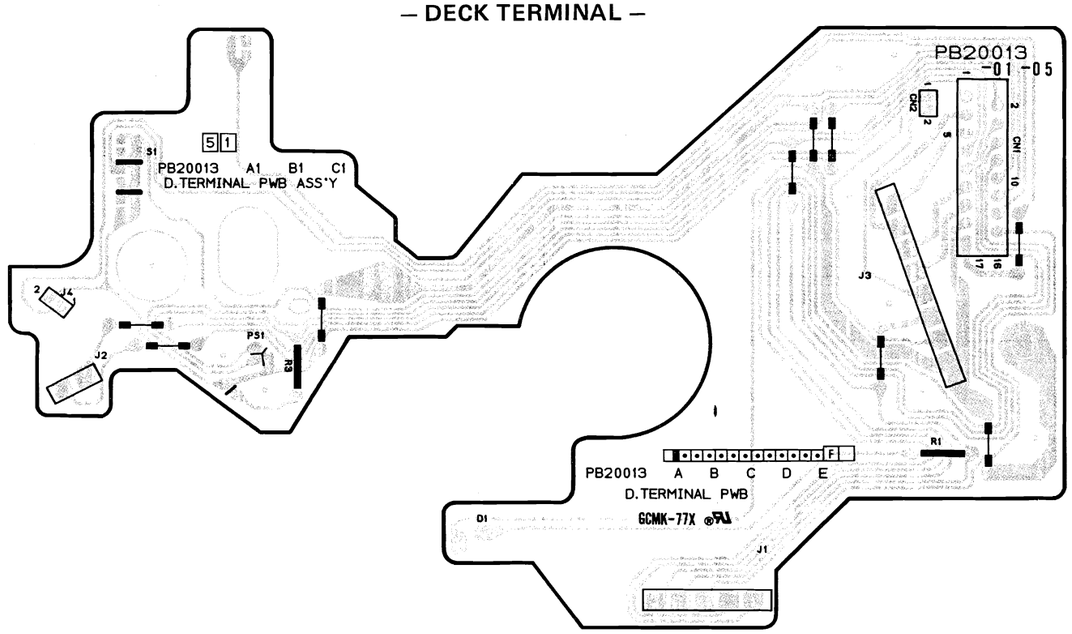
– RELAY –



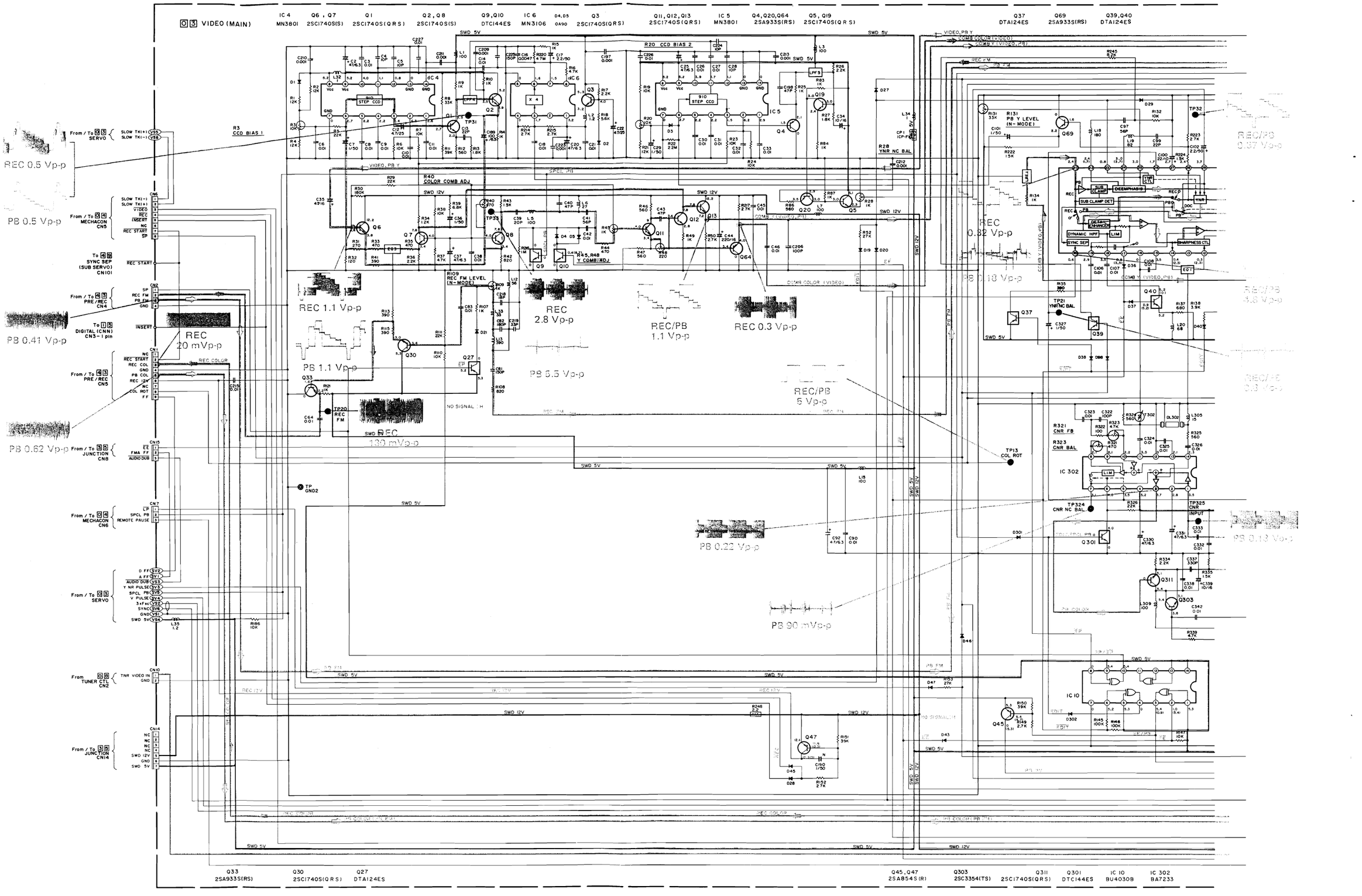
— MECHANISM CONTROL —



— DECK TERMINAL —



3.14 VIDEO SCHEMATIC DIAGRAM



Q42 2SC1740S(QRS) | Q43 2SA933S(RS) | Q35 DTC144ES | IC 1 PB20166D | Q48 DTA124ES | IC 3 M51647SP | Q54, Q70 DTC144ES | IC 14, IC 15, IC 16 LA7220 | Q56 2SC1740S(S) | Q52, Q53 2SA933S(RS) | Q57 2SC1740S(QRS) | Q49 2SA854S(R)

REC 0.6 Vp-p

REC 0.68 Vp-p

REC 1.0 Vp-p

REC/PB 1 Vp-p

REC 0.5 Vp-p

REC/PB 1.0 Vp-p

REC/PB 1.0 Vp-p

REC/PB 1.1 Vp-p

REC/PB 0.6 Vp-p

REC 0.6 Vp-p

REC 1.1 Vp-p

REC 0.24 Vp-p

REC 1.4 Vp-p

REC 1.0 Vp-p

REC/PB 0.26 Vp-p

REC/PB 5 Vp-p

REC 100 mVp-p

REC 20 mVp-p

REC 1.0 Vp-p

REC 0.4 Vp-p

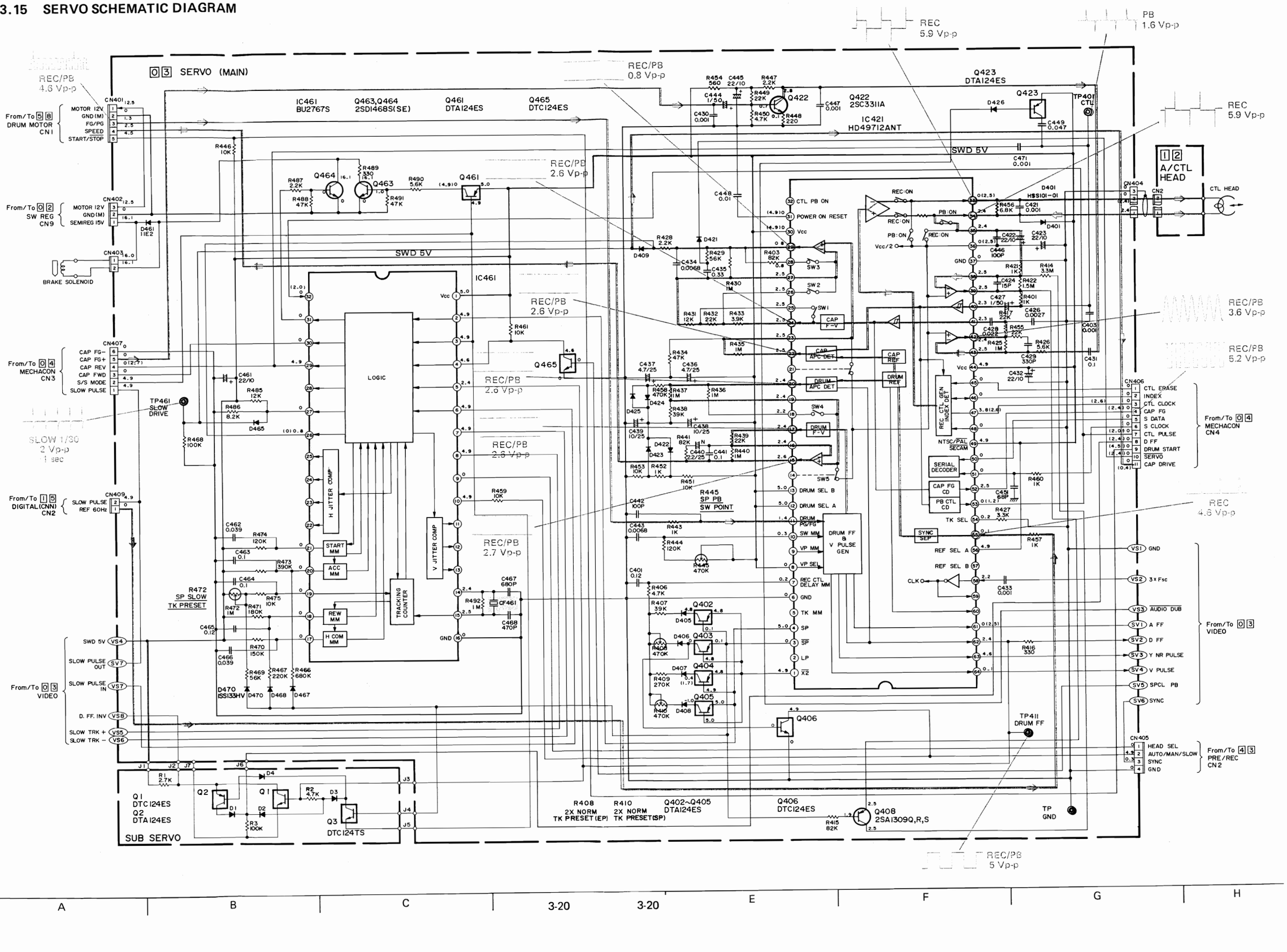
REC 0.4 Vp-p

REC 1.0 Vp-p

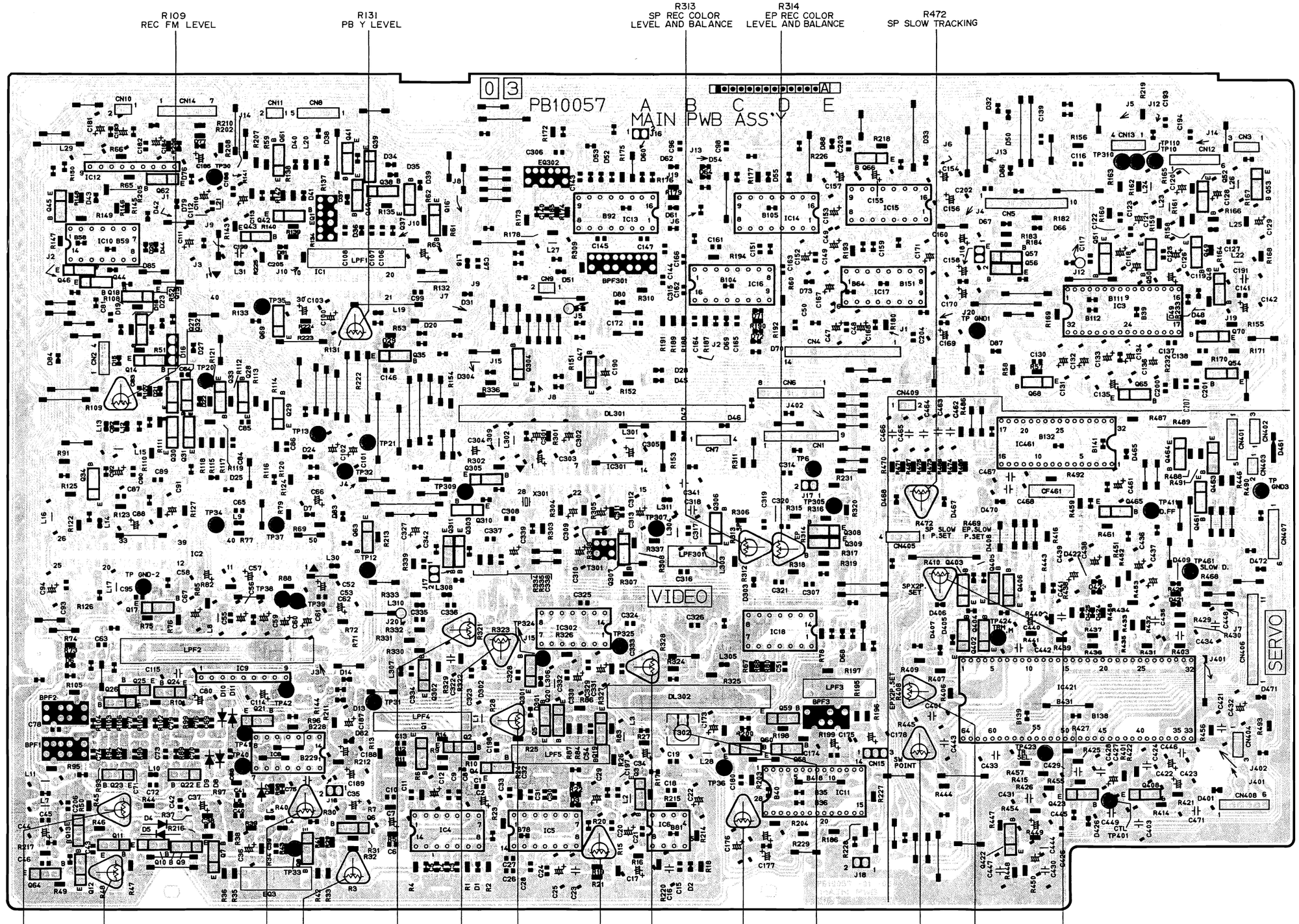
REC 1.0 Vp-p

REC 1.0

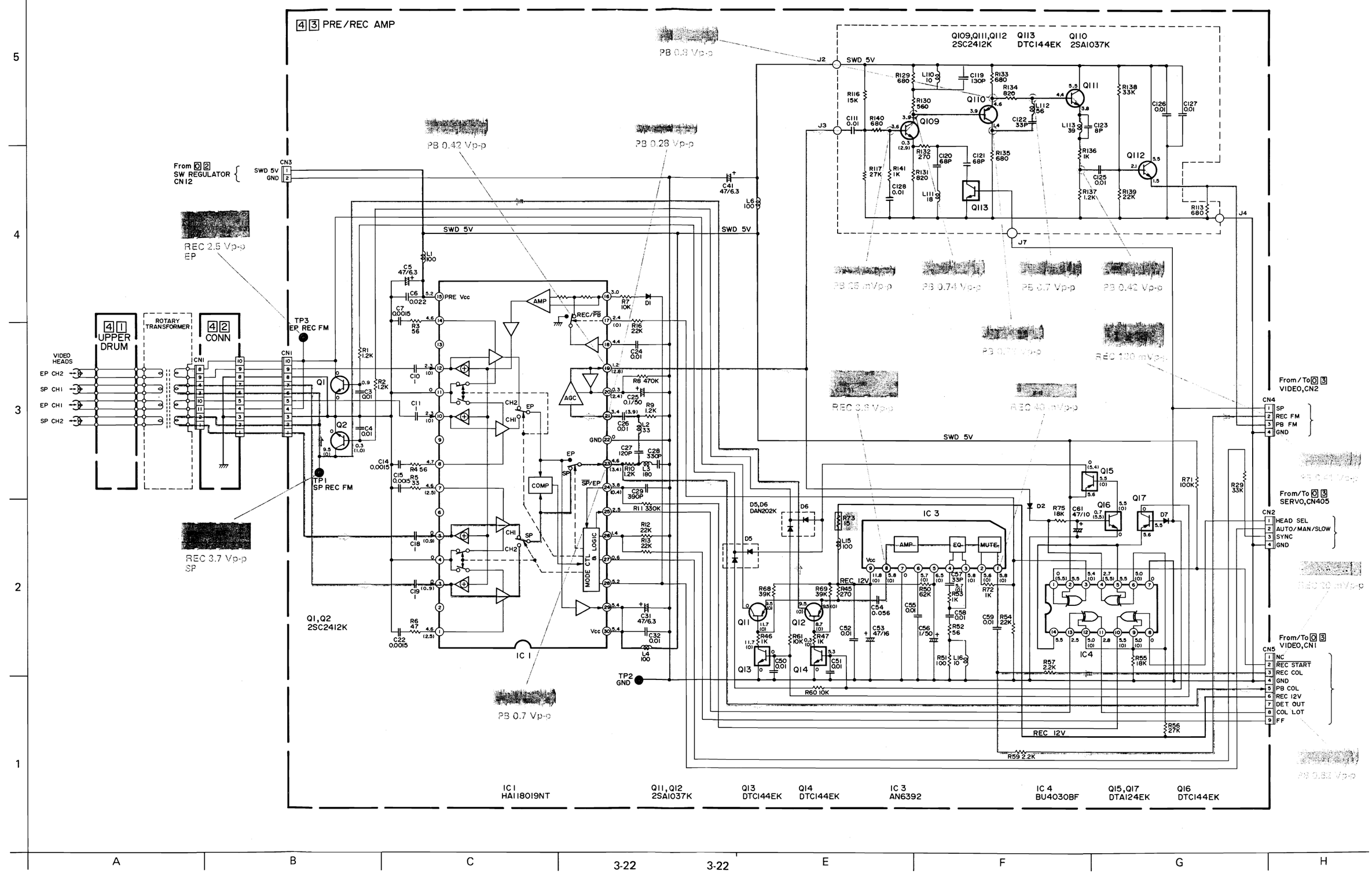
3.15 SERVO SCHEMATIC DIAGRAM



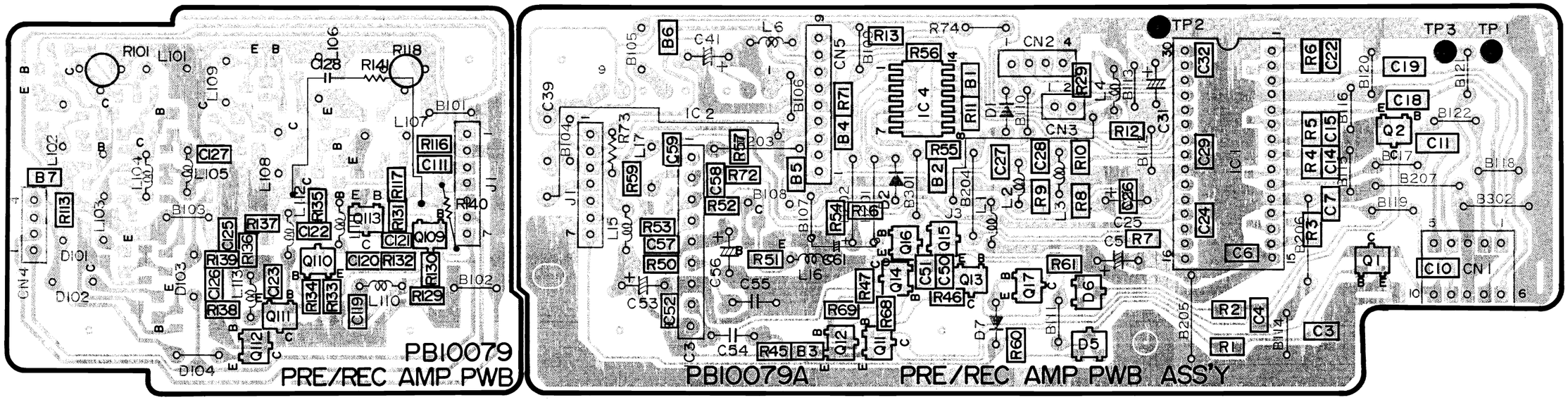
3.16 MAIN (VIDEO/SERVO) CIRCUIT BOARDS



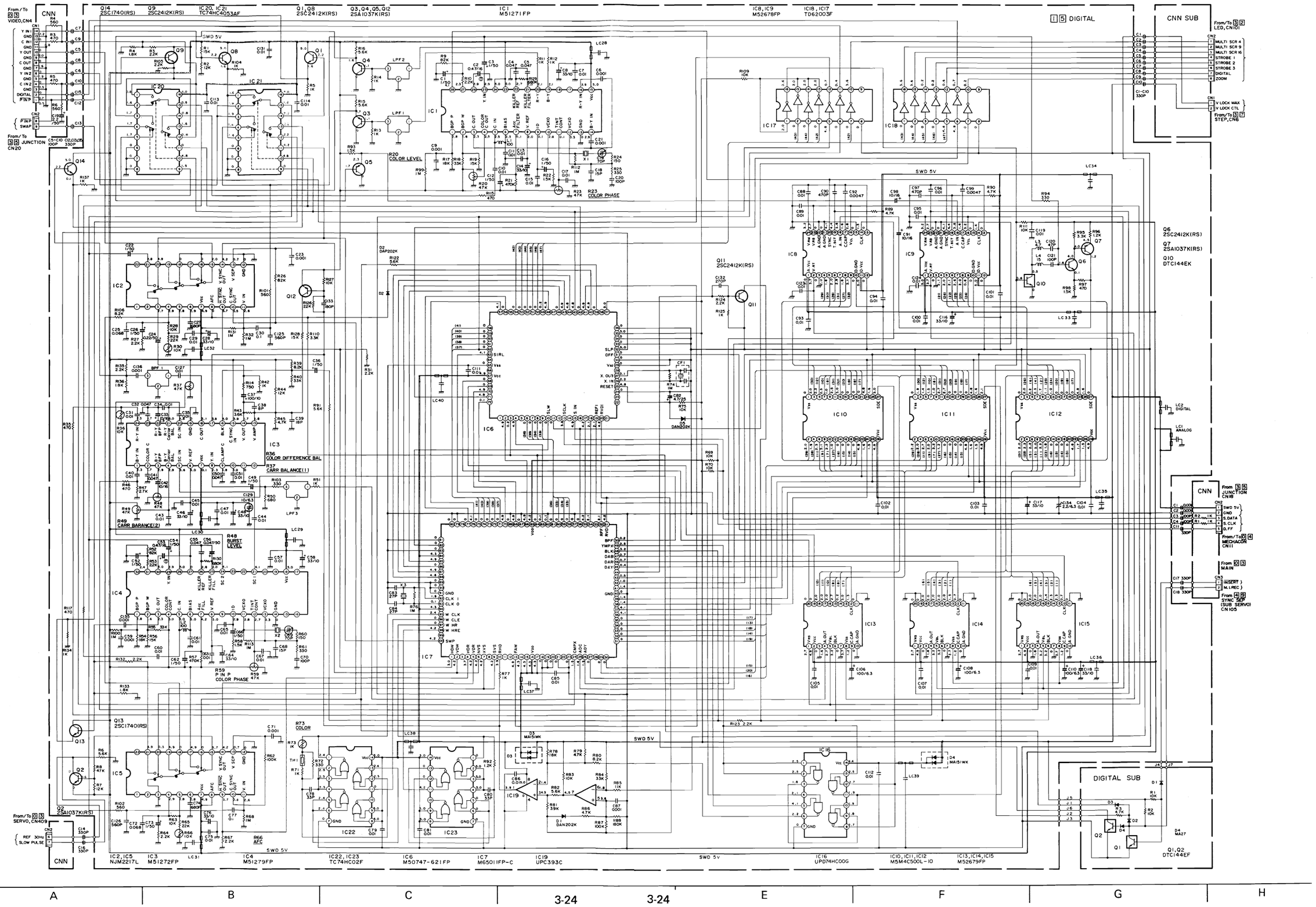
3.17 PREREC SCHEMATIC DIAGRAM



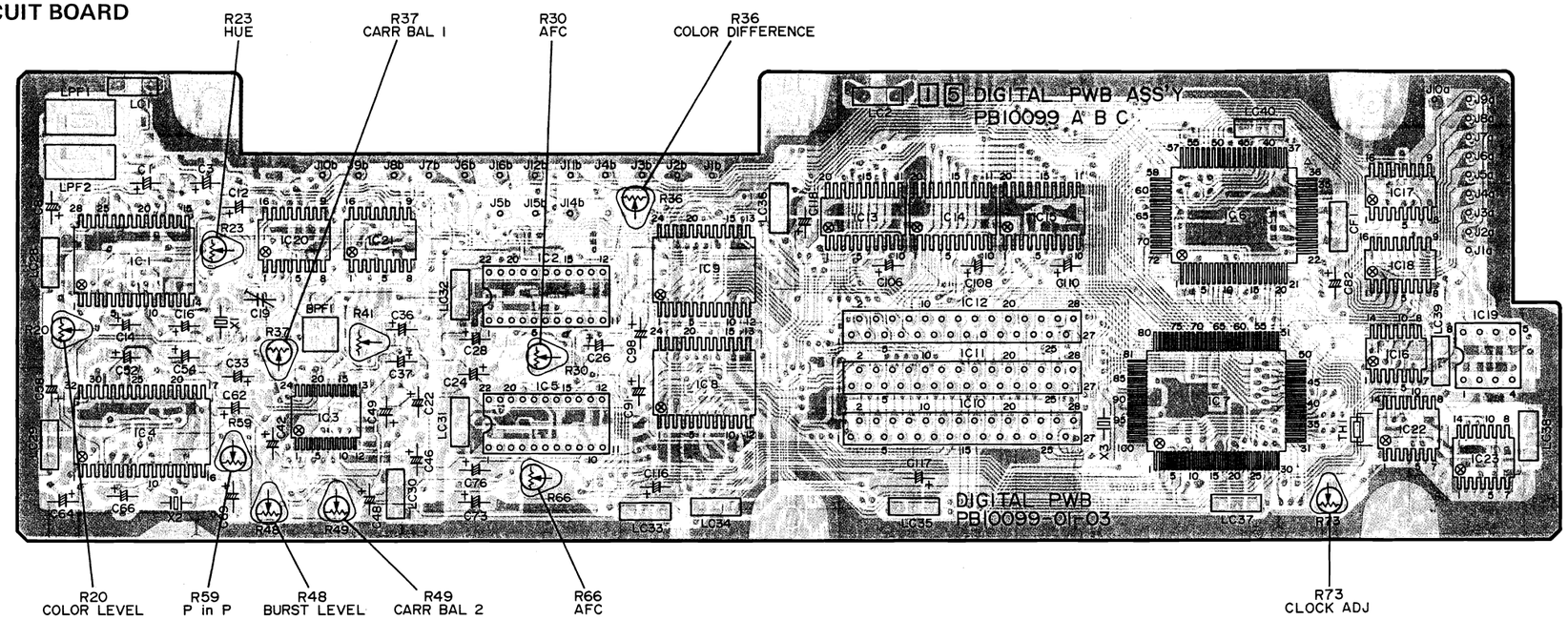
3.18 PRE/REC AMP CIRCUIT BOARD

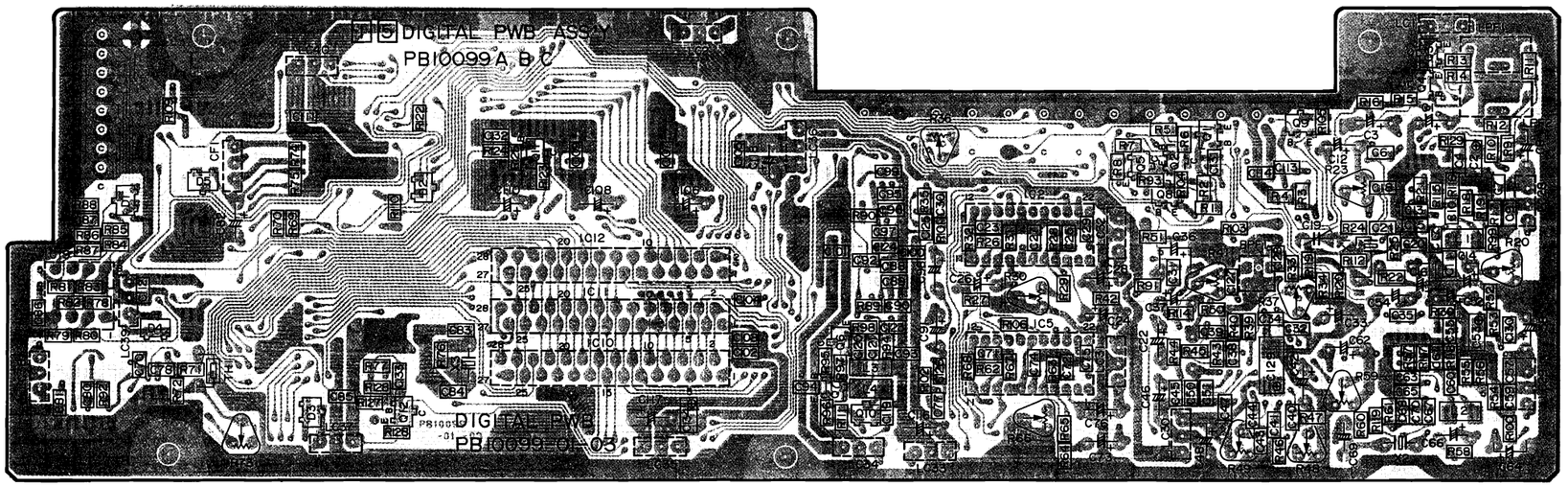


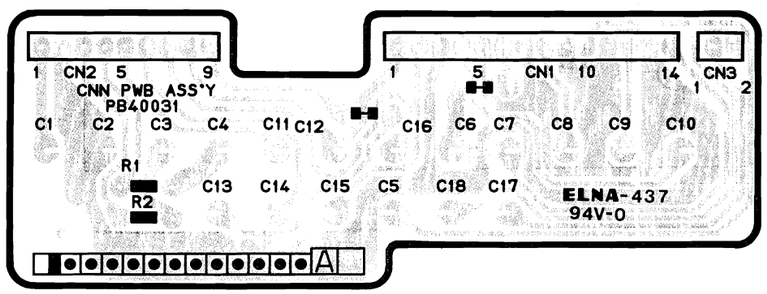
3.19 DIGITAL SCHEMATIC DIAGRAM

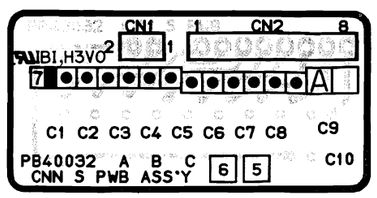


3.20 DIGITAL CIRCUIT BOARD

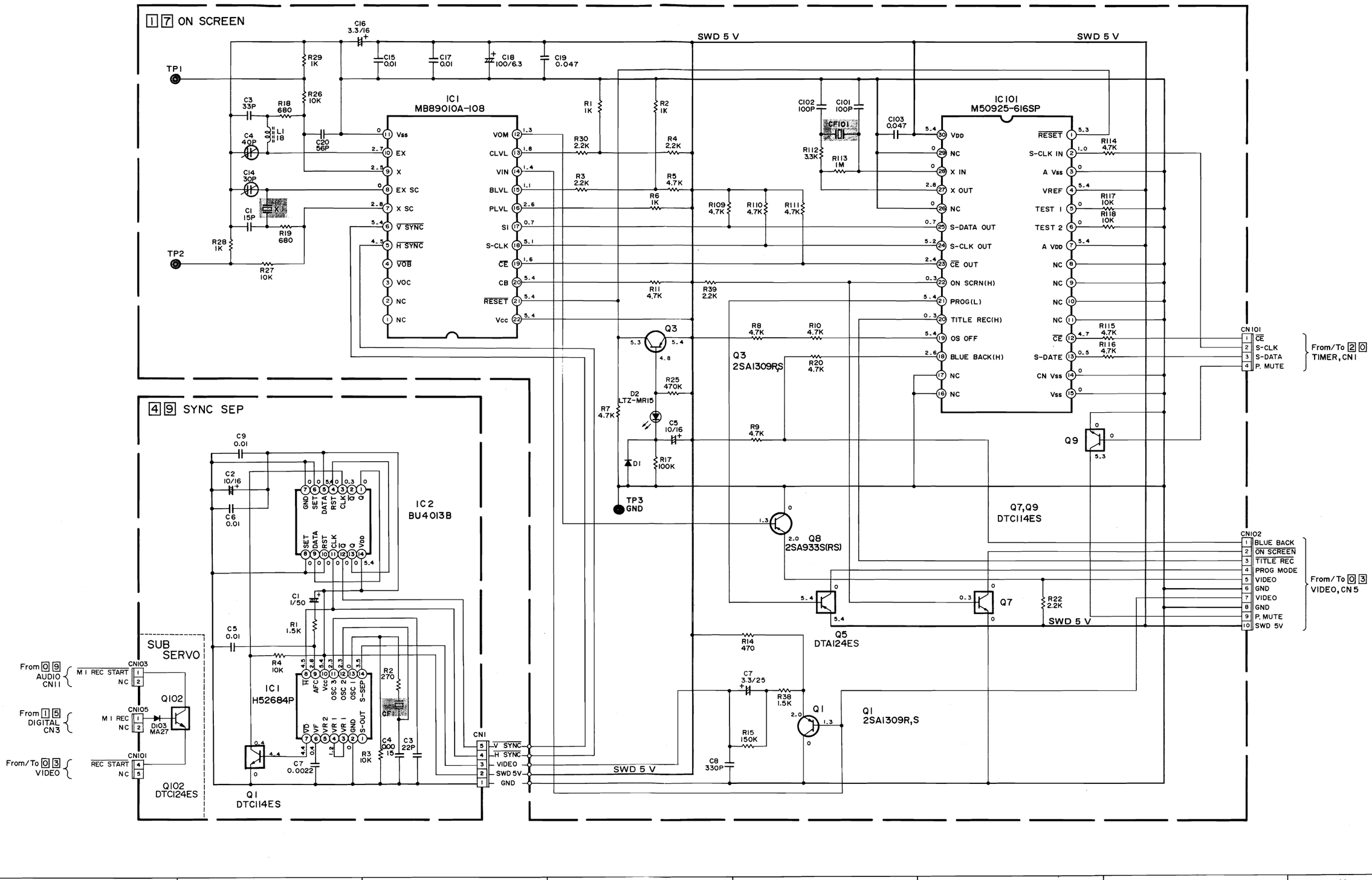






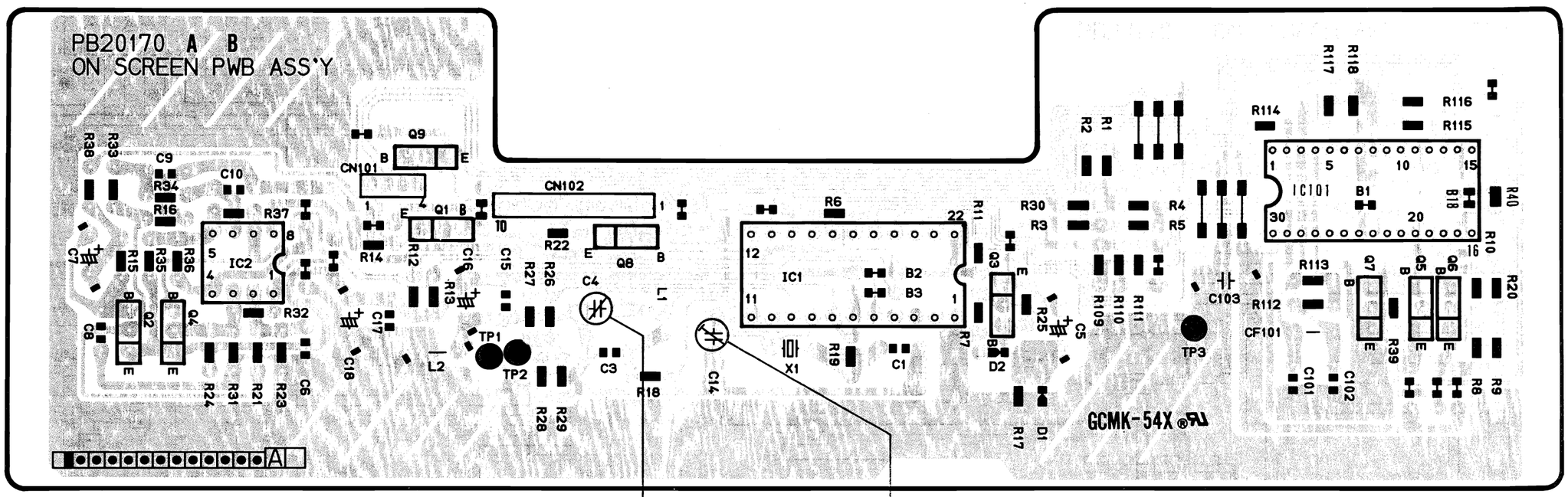


3.21 ON SCREEN AND SYNC SEP/SUB SERVO SCHEMATIC DIAGRAMS

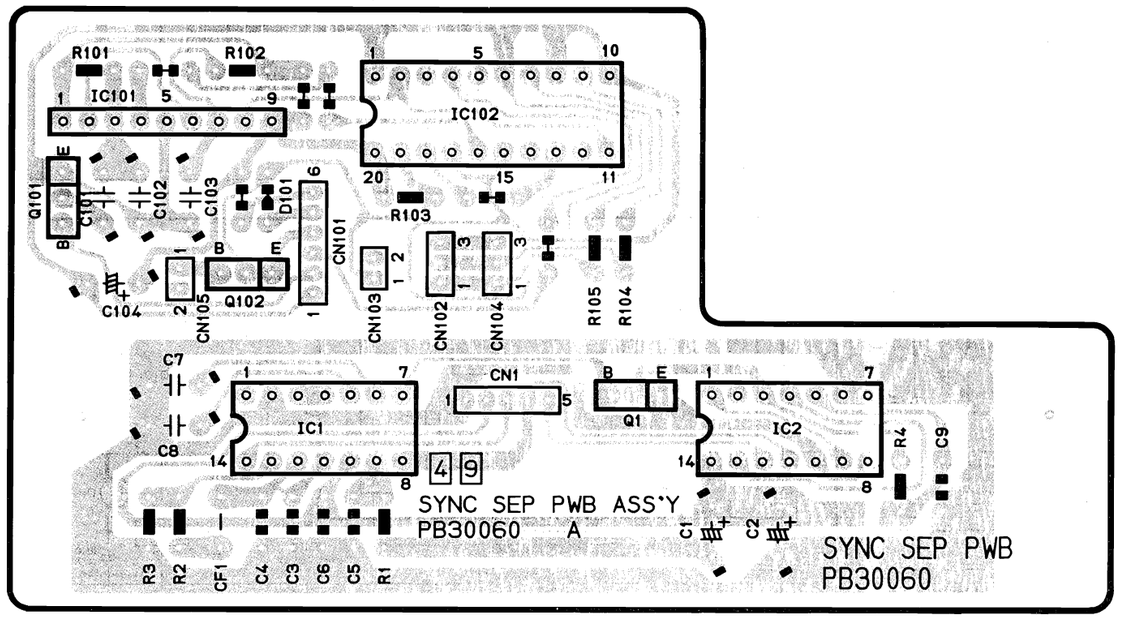


3.22 ONSCREEN, SYNC SEP/SUB SERVO CIRCUIT BOARDS

— ON SCREEN —



— SYNC SET/SUB SERVO —



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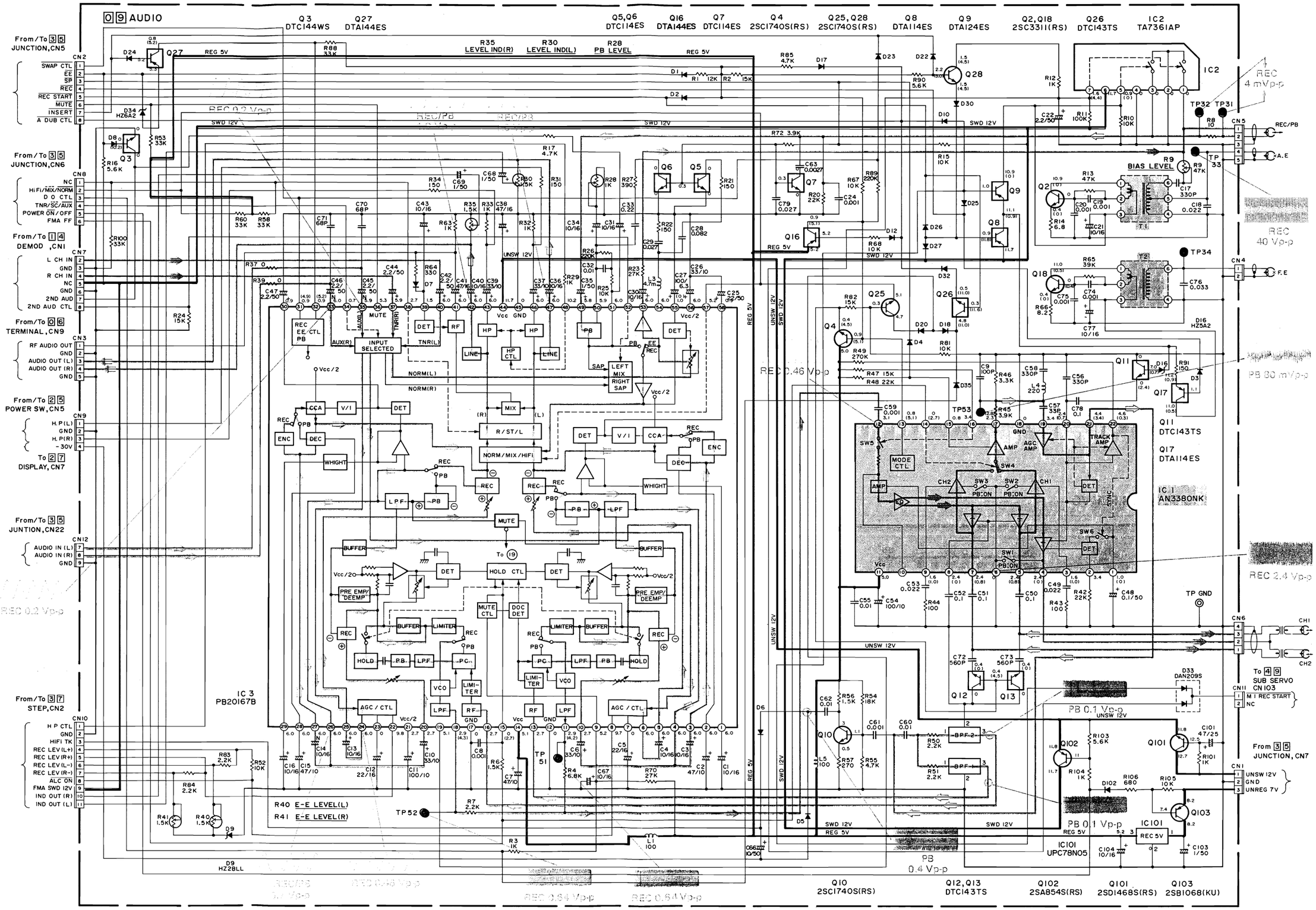
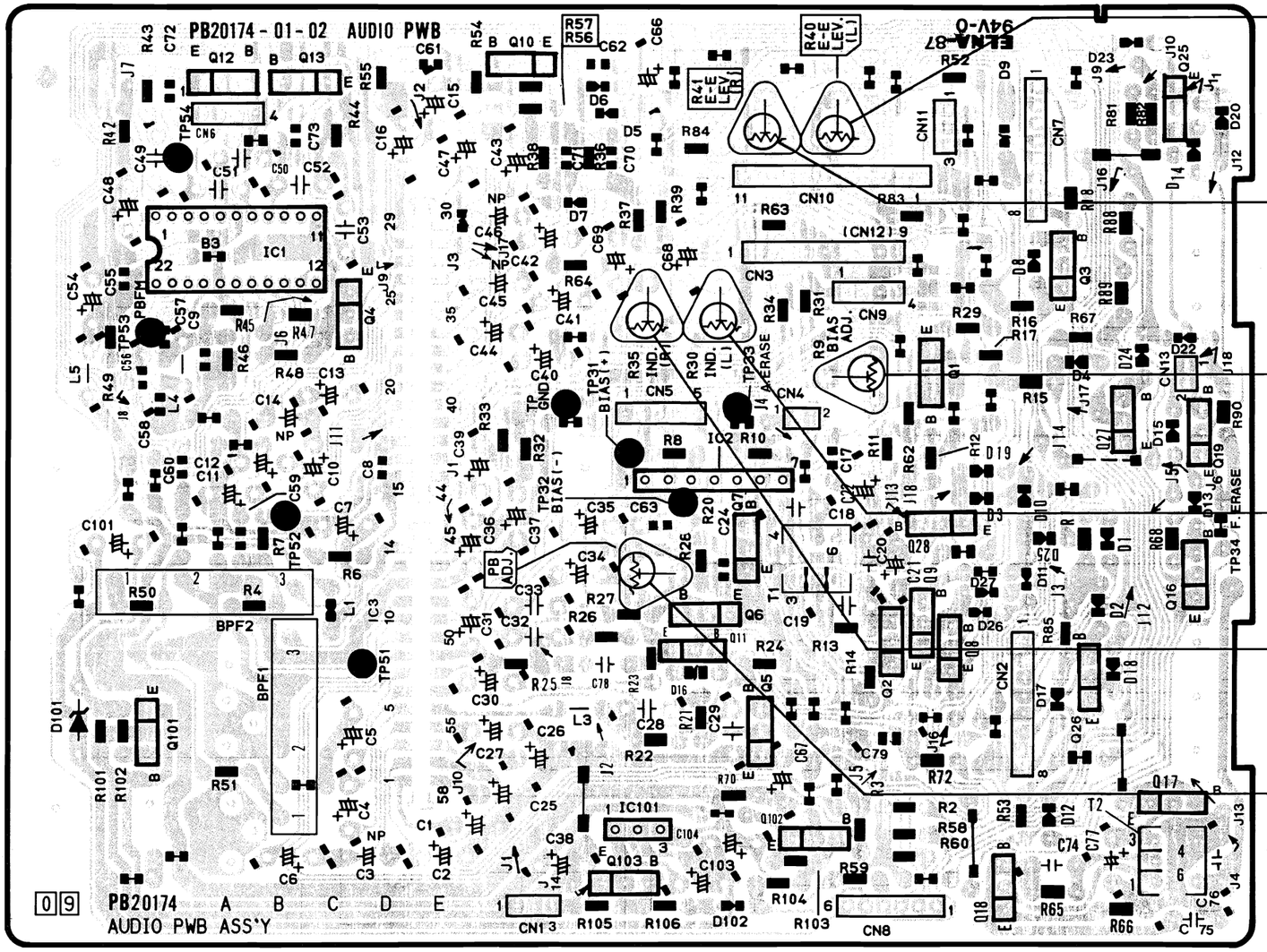
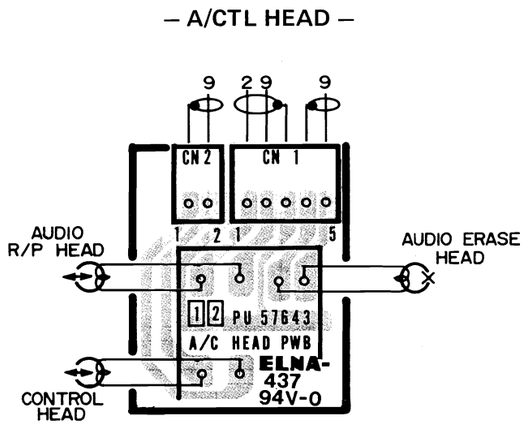
3.23 AUDIO SCHEMATIC DIAGRAM



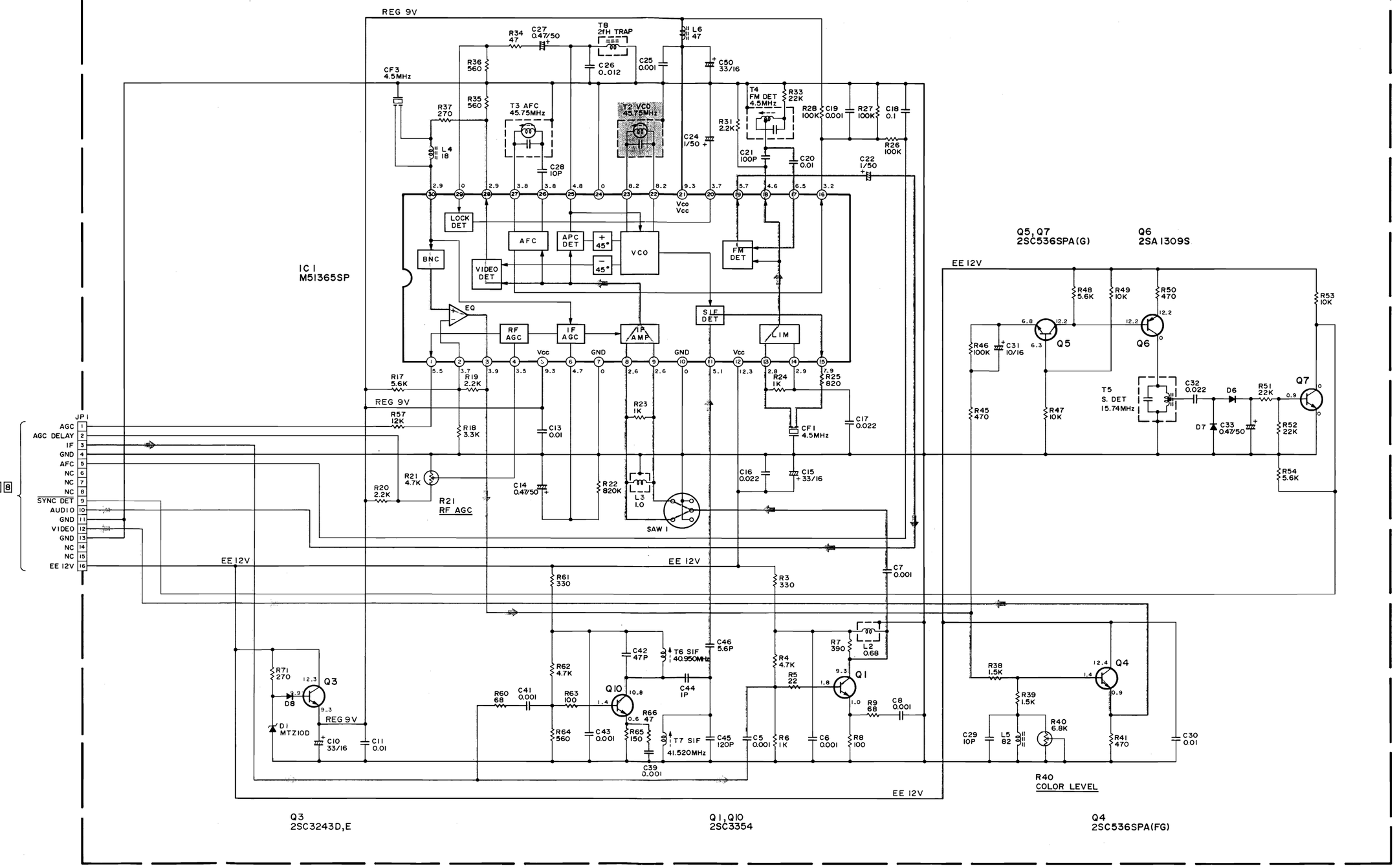
3.24 AUDIO AND A/CTL HEAD CIRCUIT BOARDS





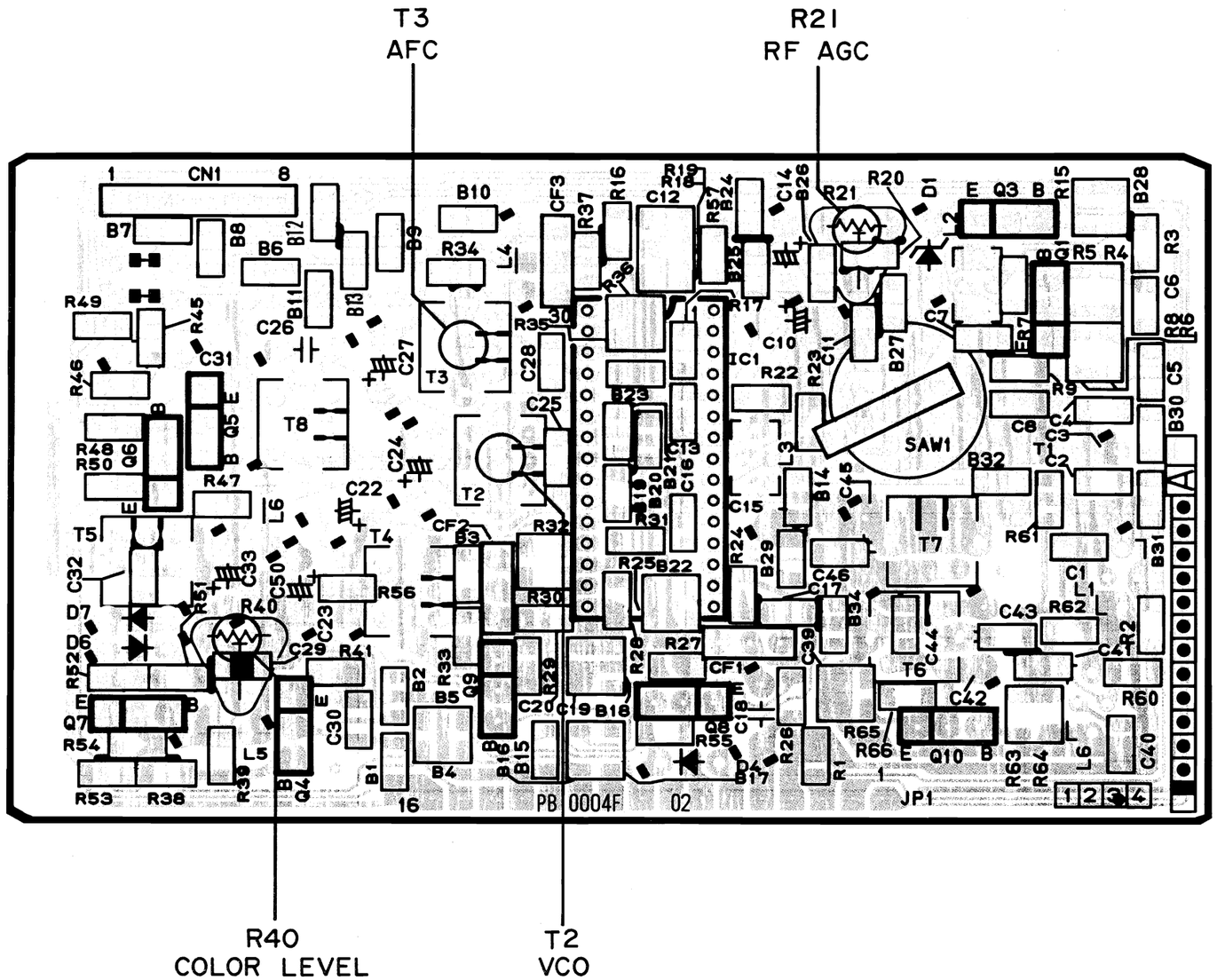
3.25 IF SCHEMATIC DIAGRAM

07 IF

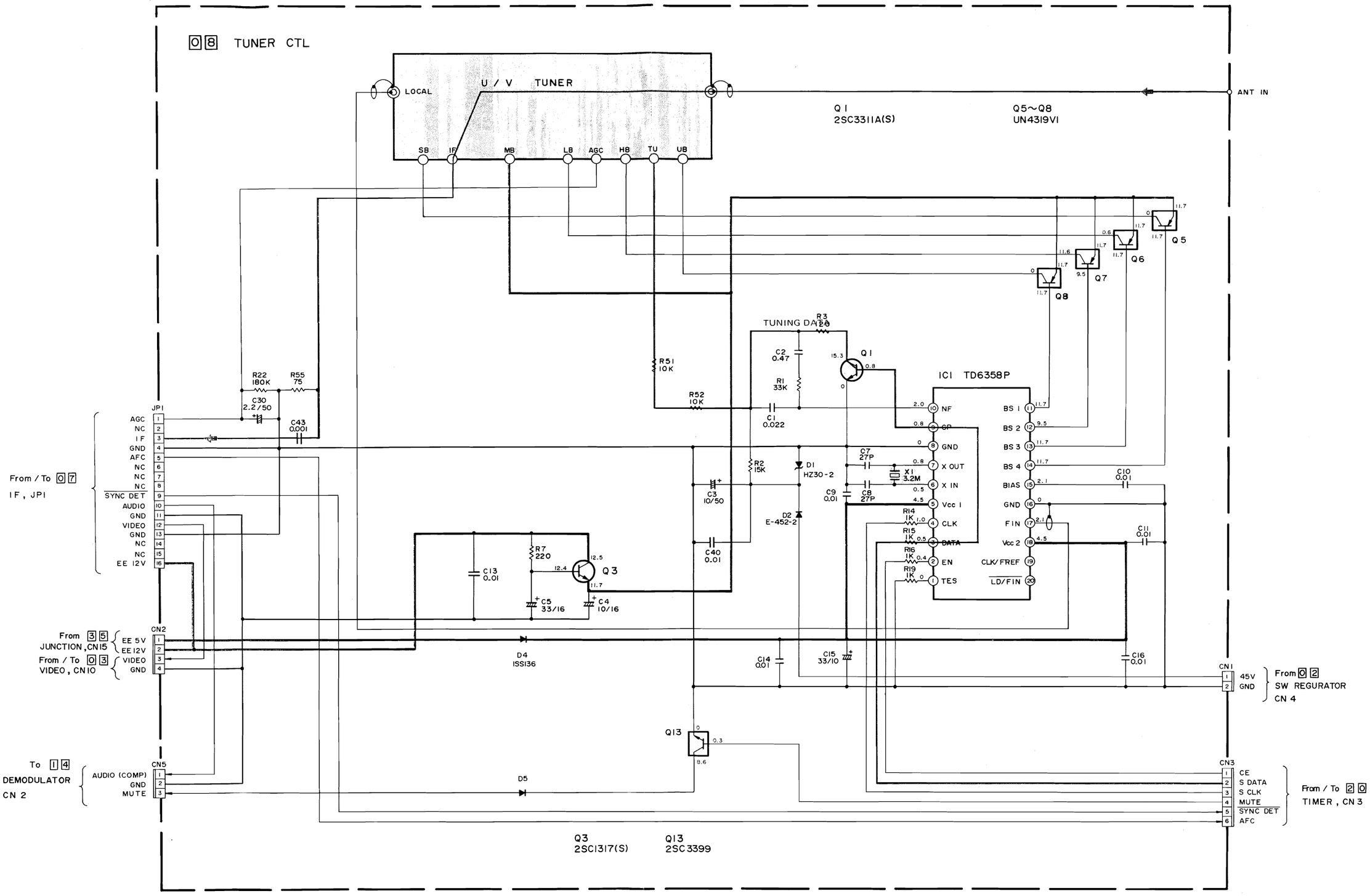


Note: Voltages are DC-measured with a digital voltmeter during stop and tuner mode.

3.26 IF CIRCUIT BOARD

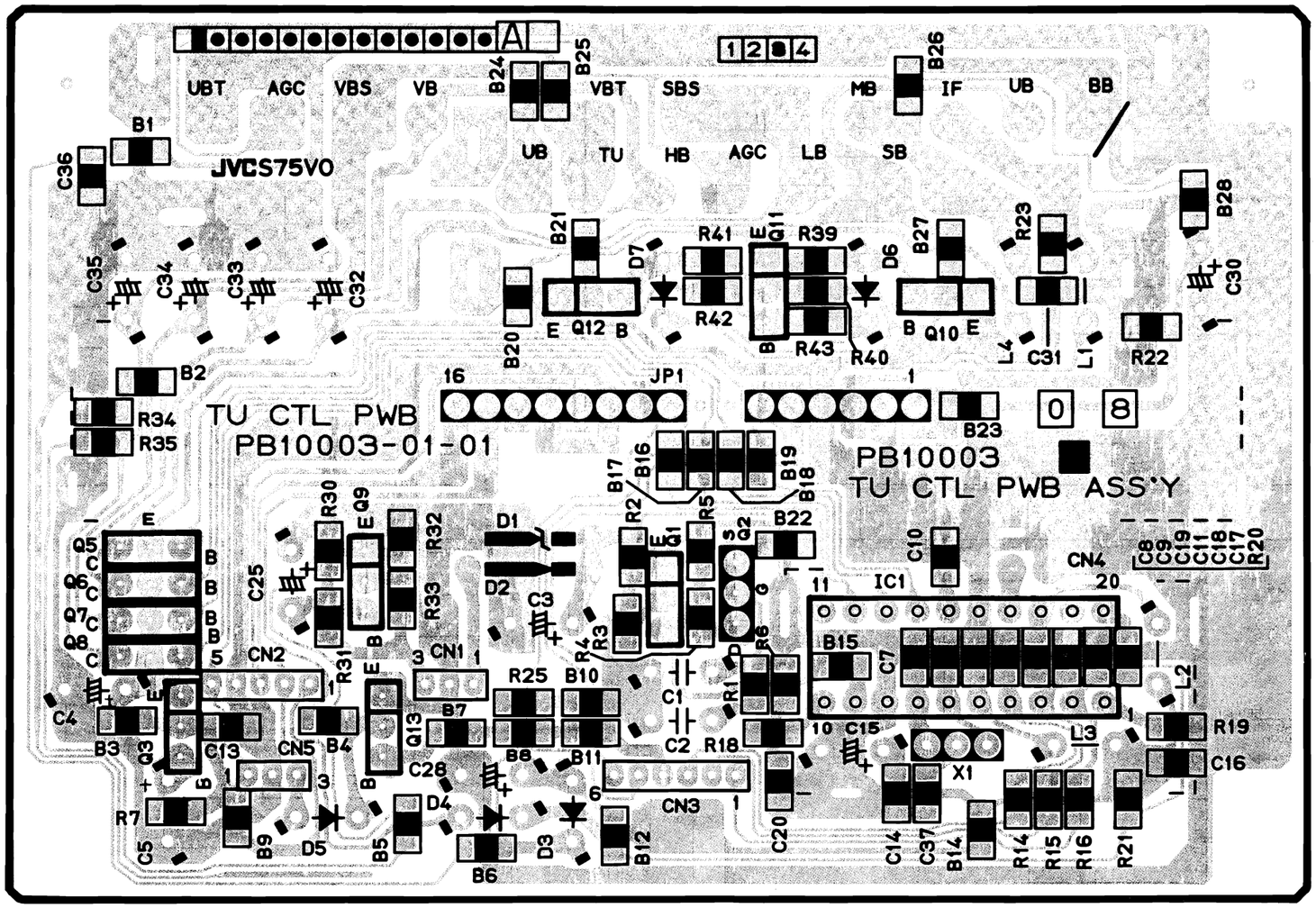


3.27 TUNER CONTROL SCHEMATIC DIAGRAM

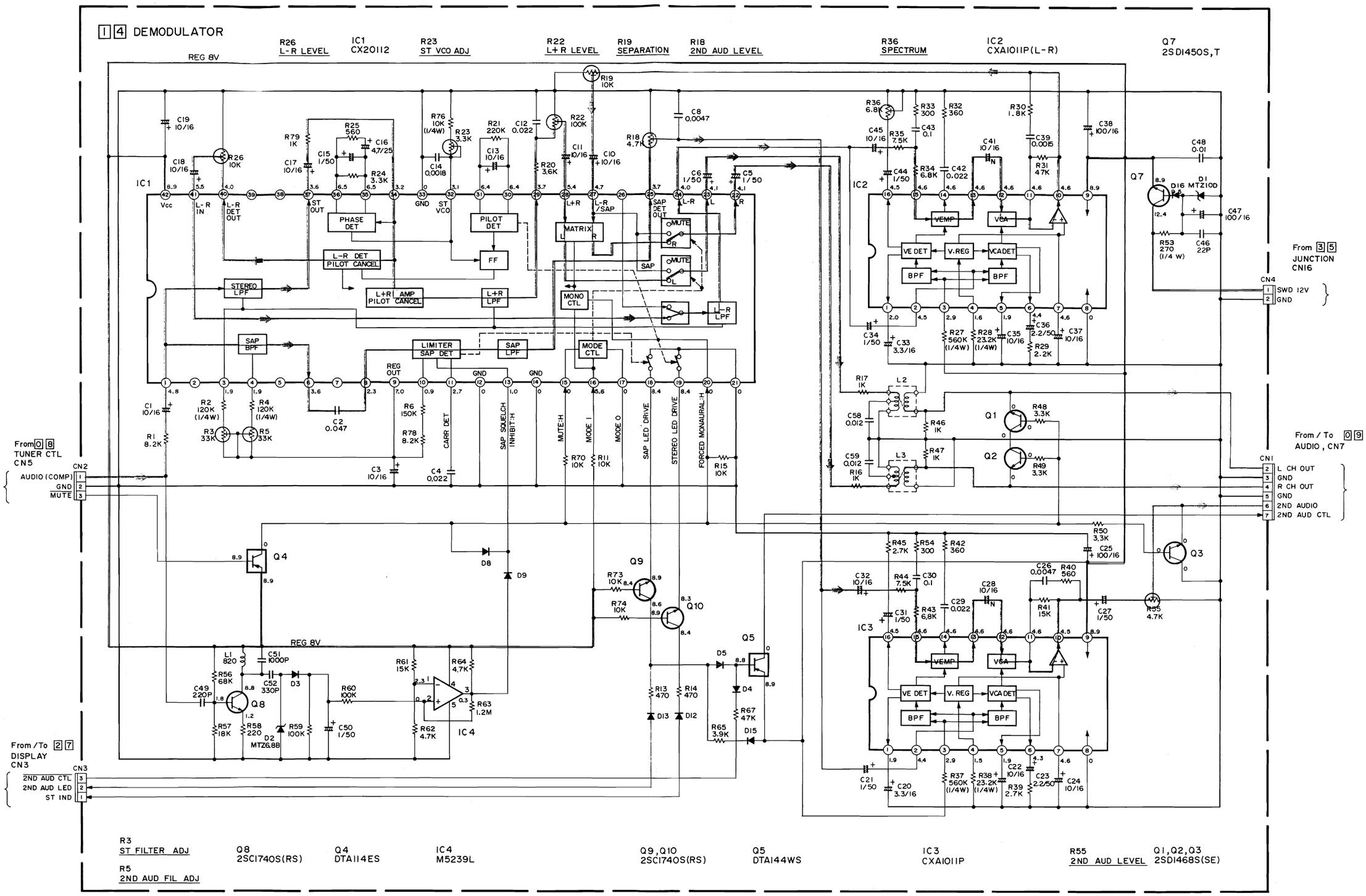


Note: Voltages are DC-measured with a digital voltmeter during stop and tuner mode.

3.28 TUNER CONTROL CIRCUIT BOARD

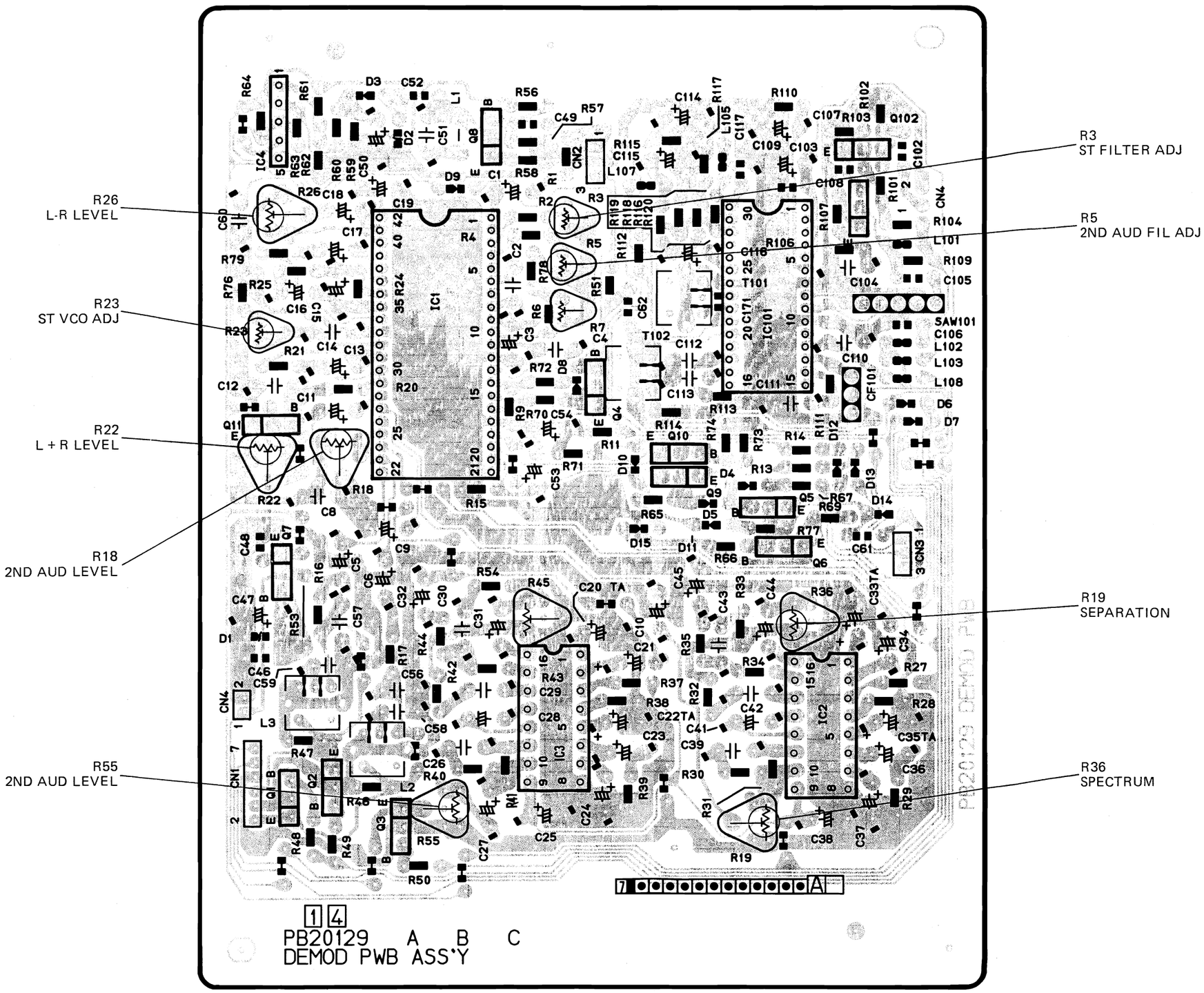


3.29 DEMODULATOR SCHEMATIC DIAGRAM

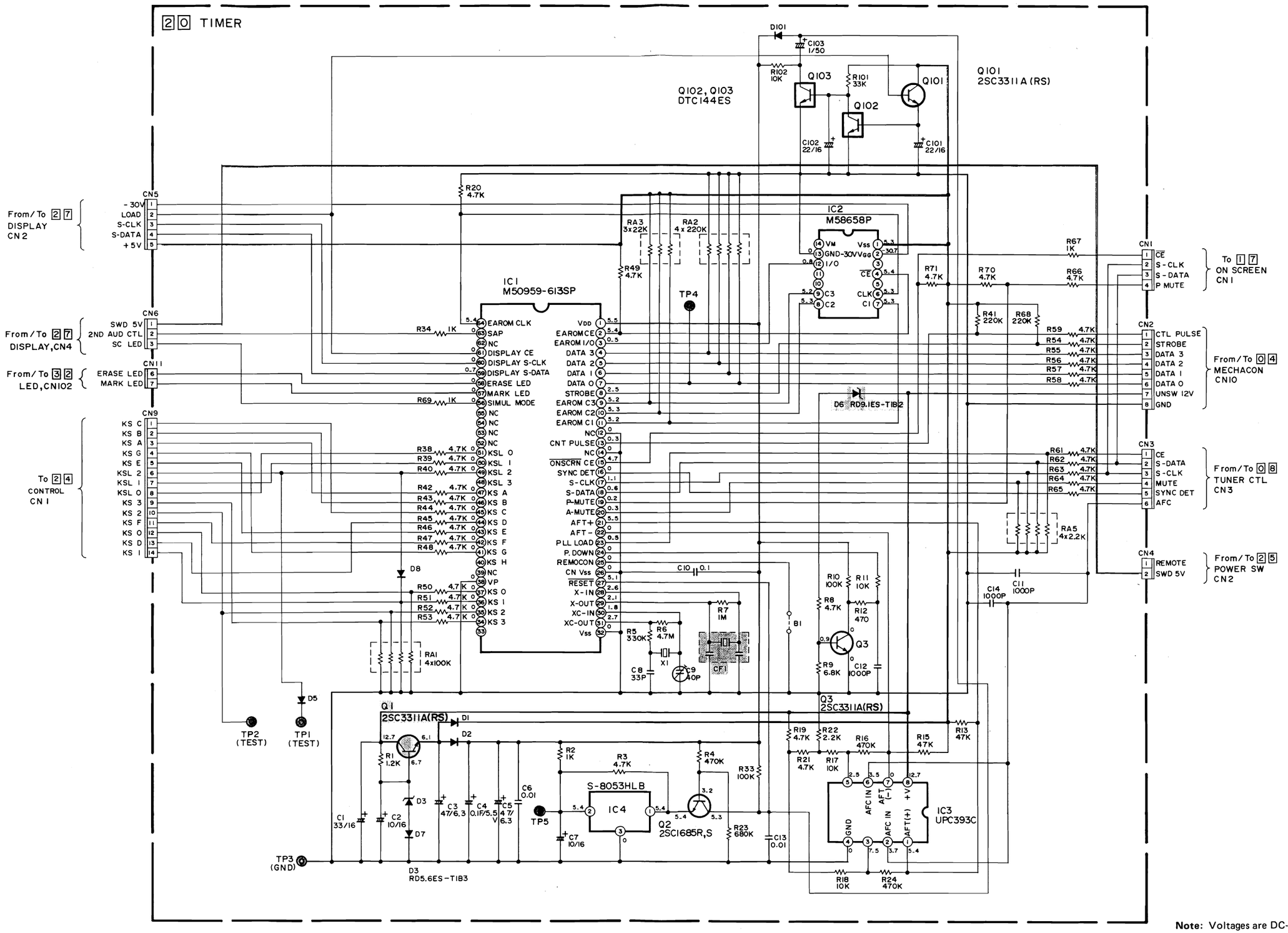


Note: Voltages are DC-measured with a digital voltmeter during stop and tuner mode.

3.30 DEMODULATOR CIRCUIT BOARD



3.31 TIMER SCHEMATIC DIAGRAM



Note: Voltages are DC-measured with a digital voltmeter during stop mode.

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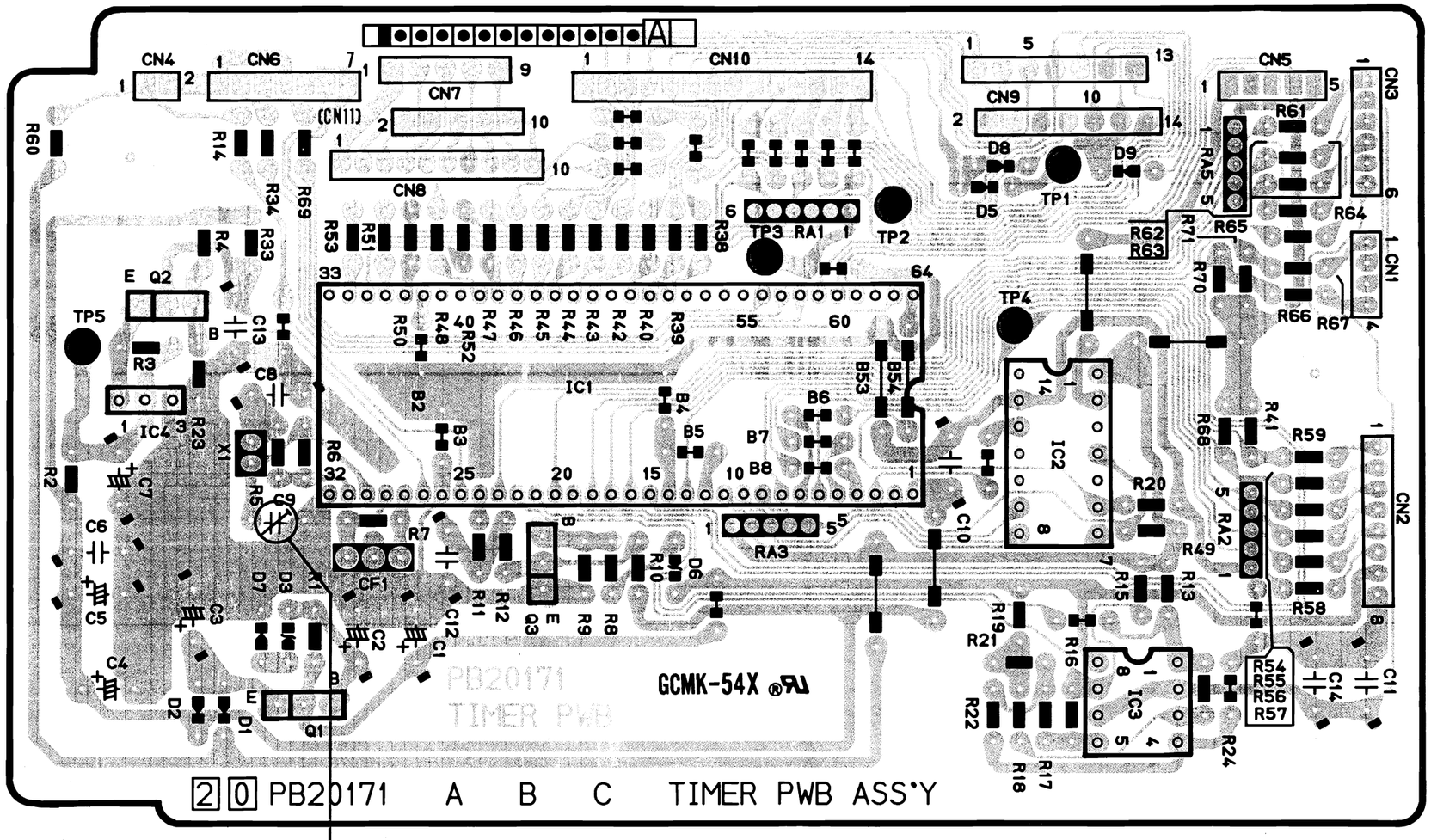
3.32 TIMER CIRCUIT BOARD



C9
TIMER CLOCK

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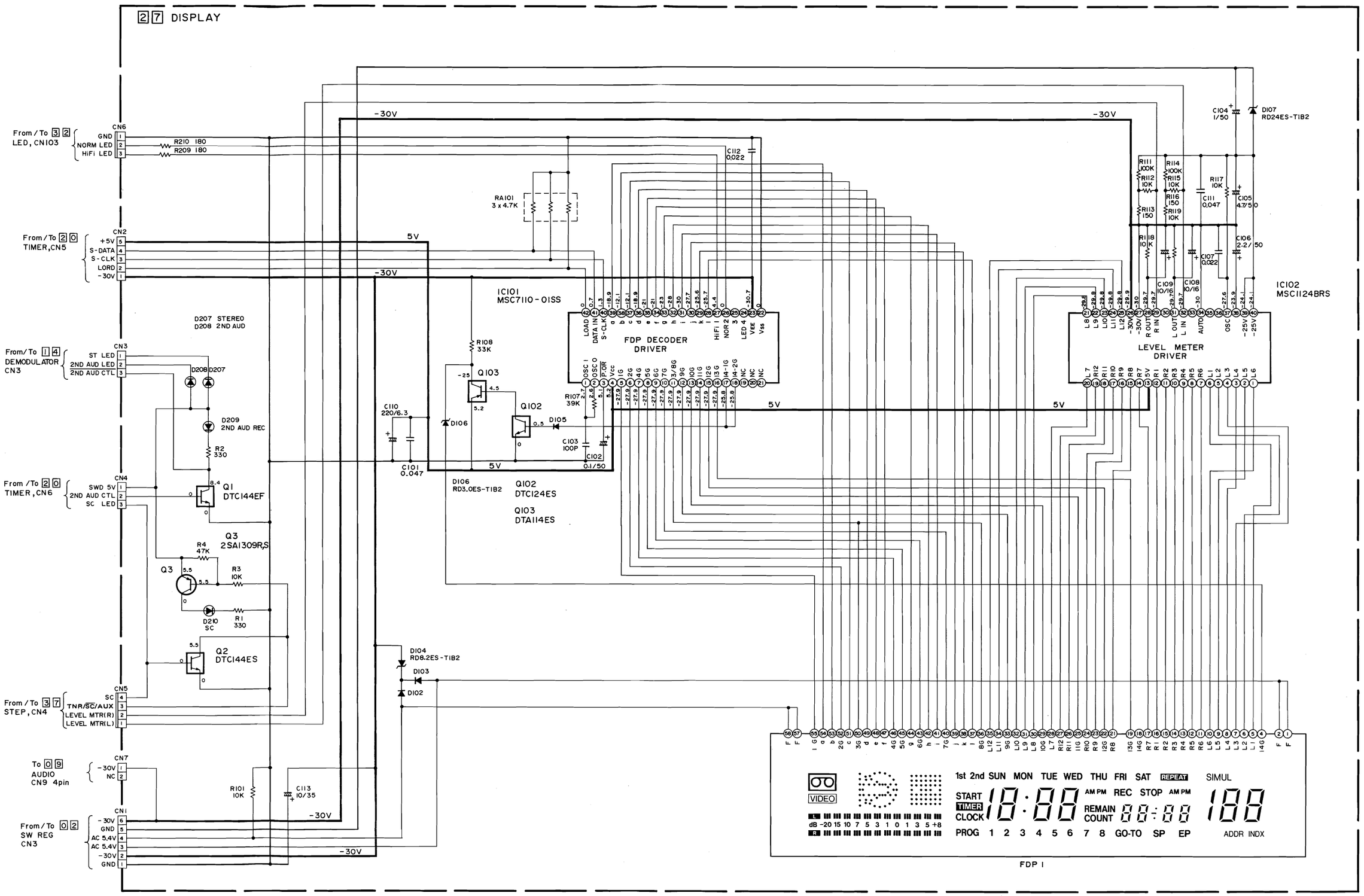
3.33 DISPLAY SCHEMATIC DIAGRAM

Note: Voltages are DC-measured with a digital voltmeter during stop mode.



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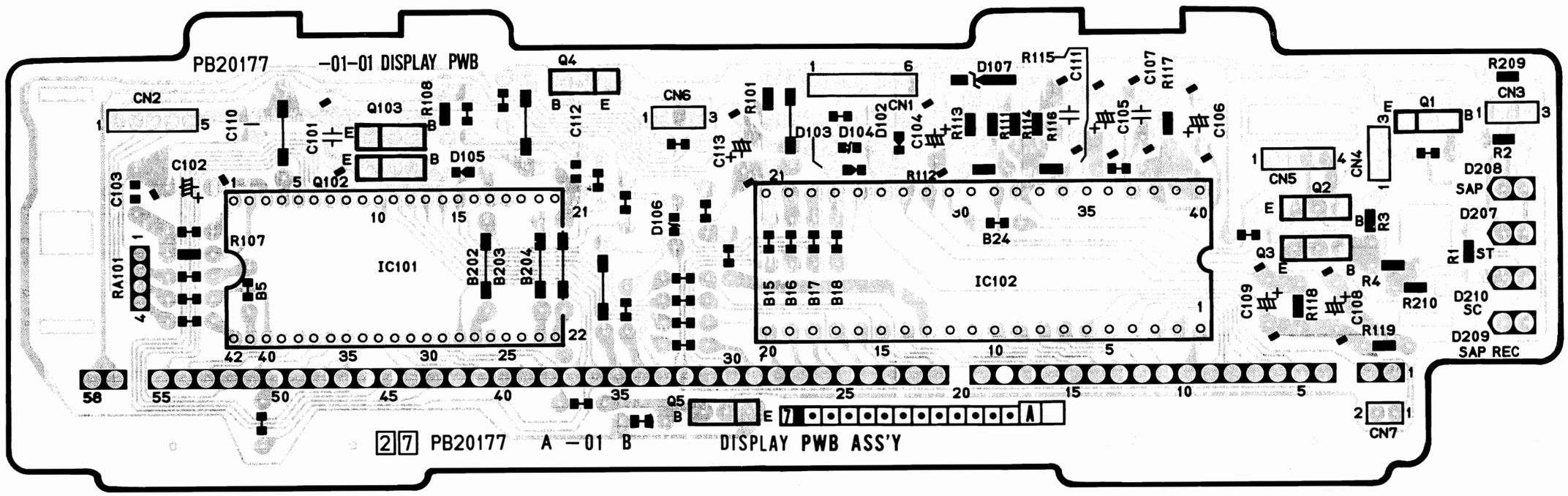
3.34 DISPLAY CIRCUIT BOARD



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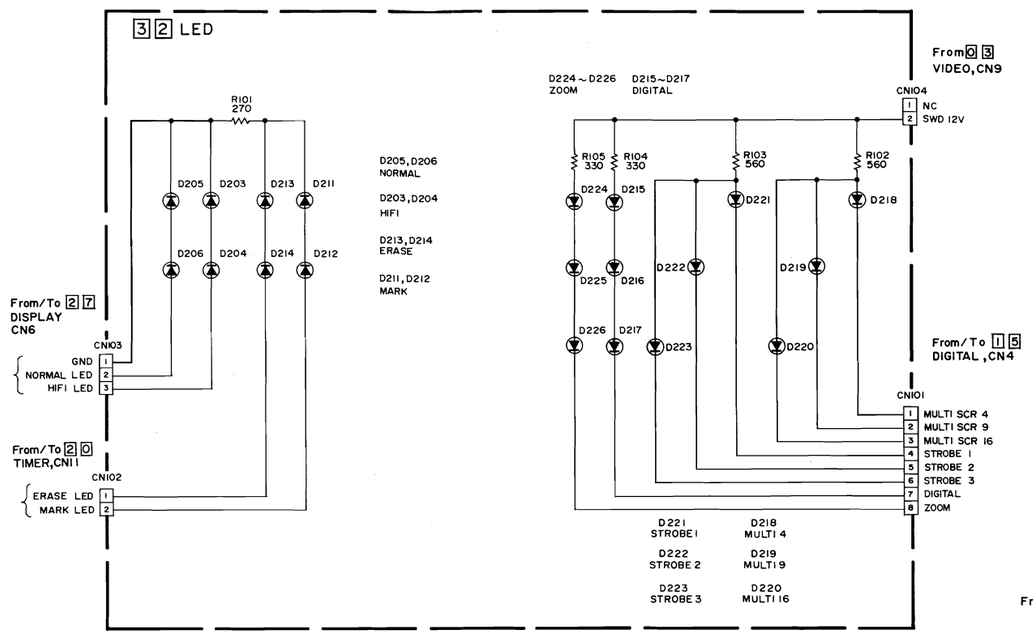
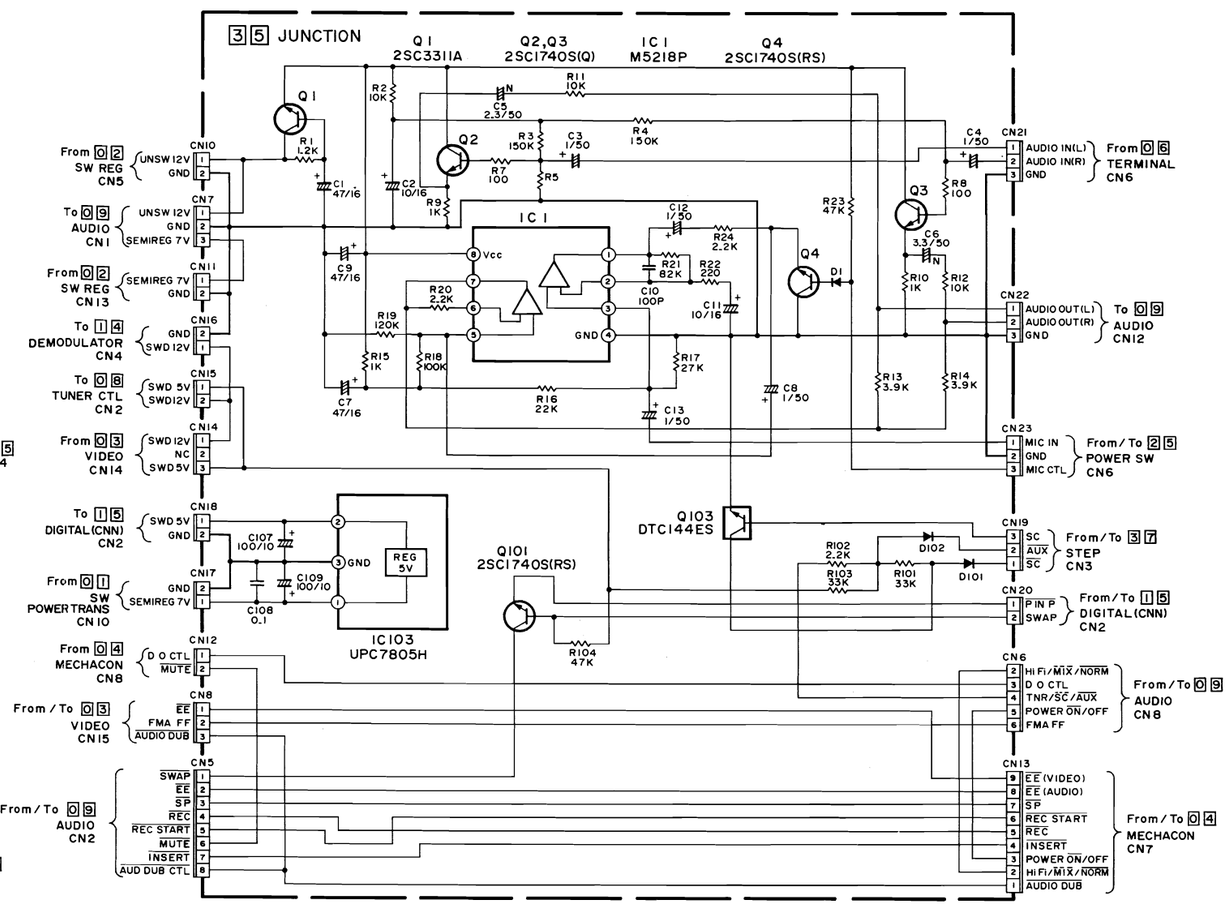
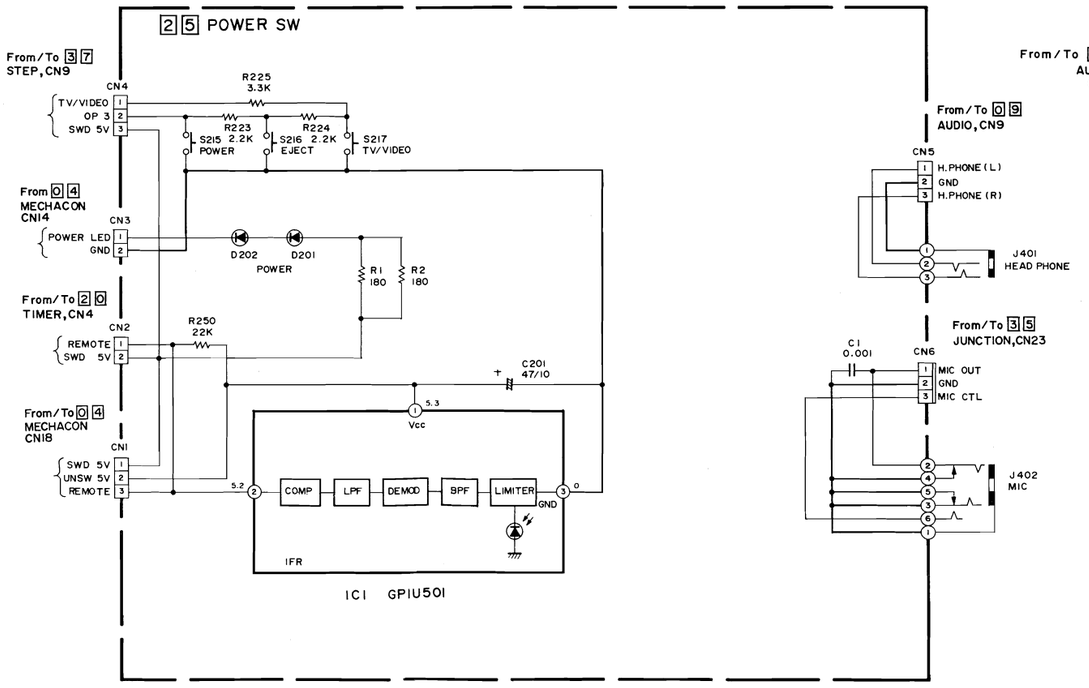
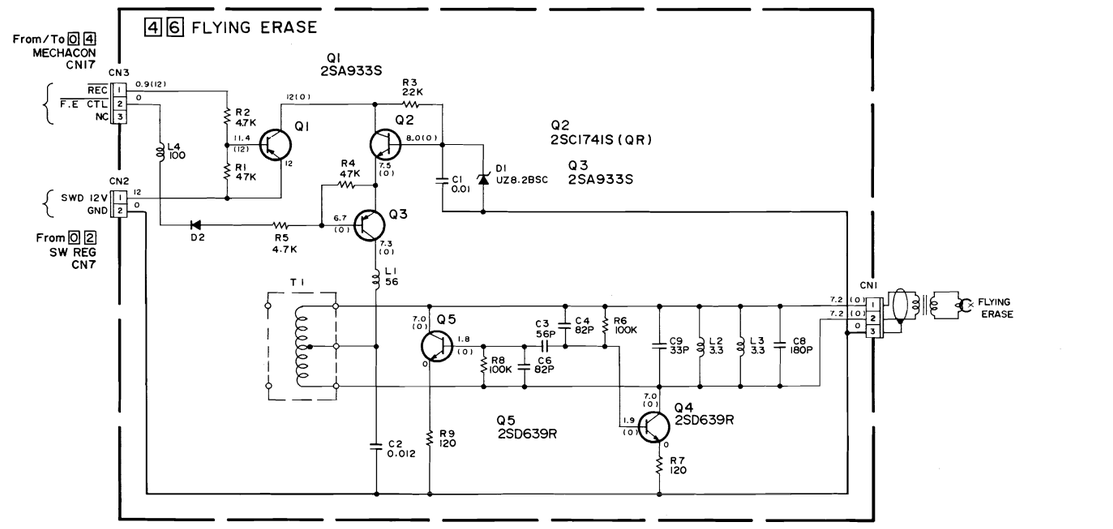
3.35 JUNCTION, POWER SWITCH, FLYING ERASE AND LED SCHEMATIC DAIGRAMS





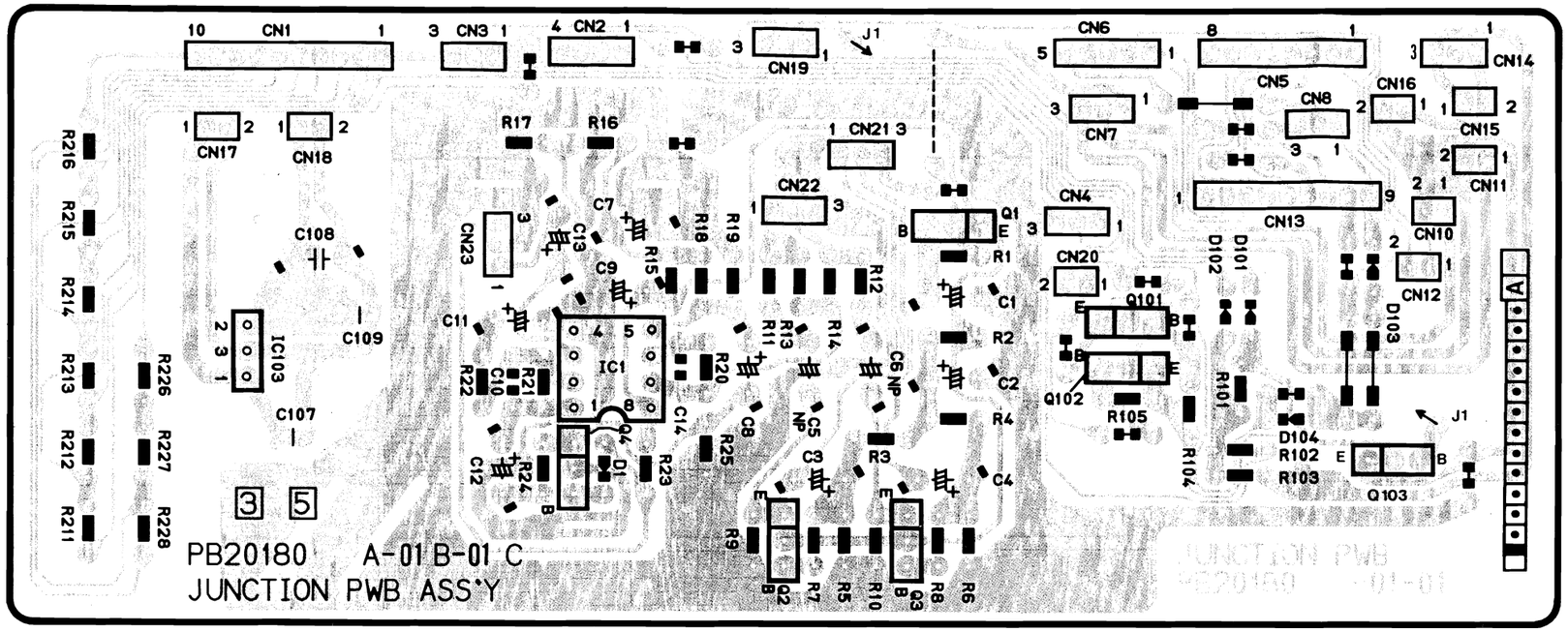




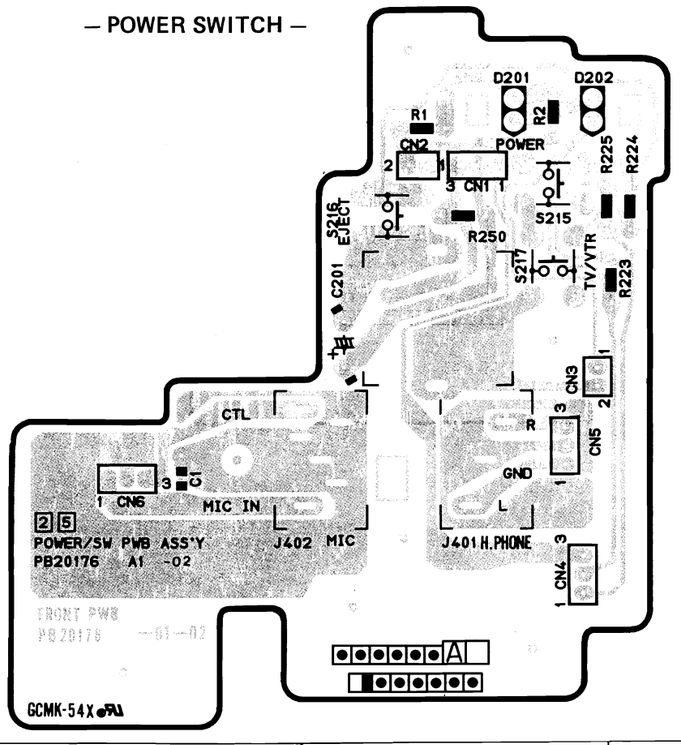
3-40

3.36 JUNCTION, POWER SWITCH, FLYING ERASE AND LED CIRCUIT BOARDS

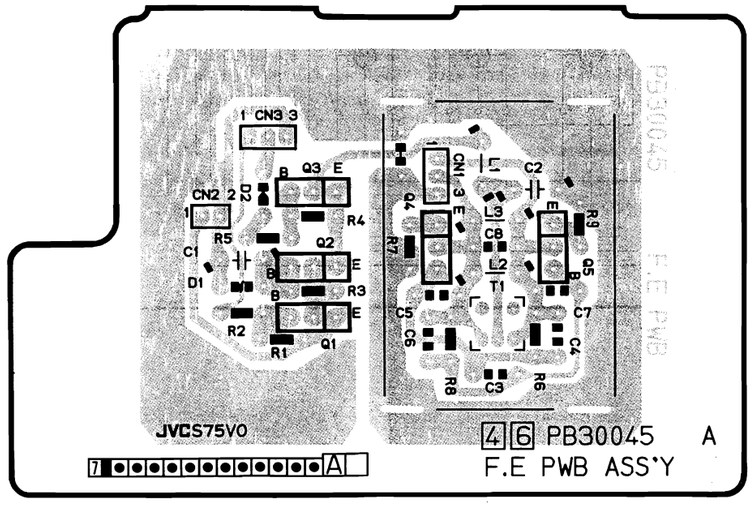
– JUNCTION –



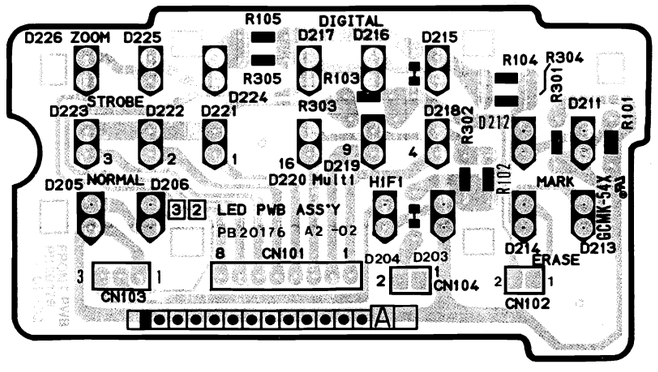
– POWER SWITCH –



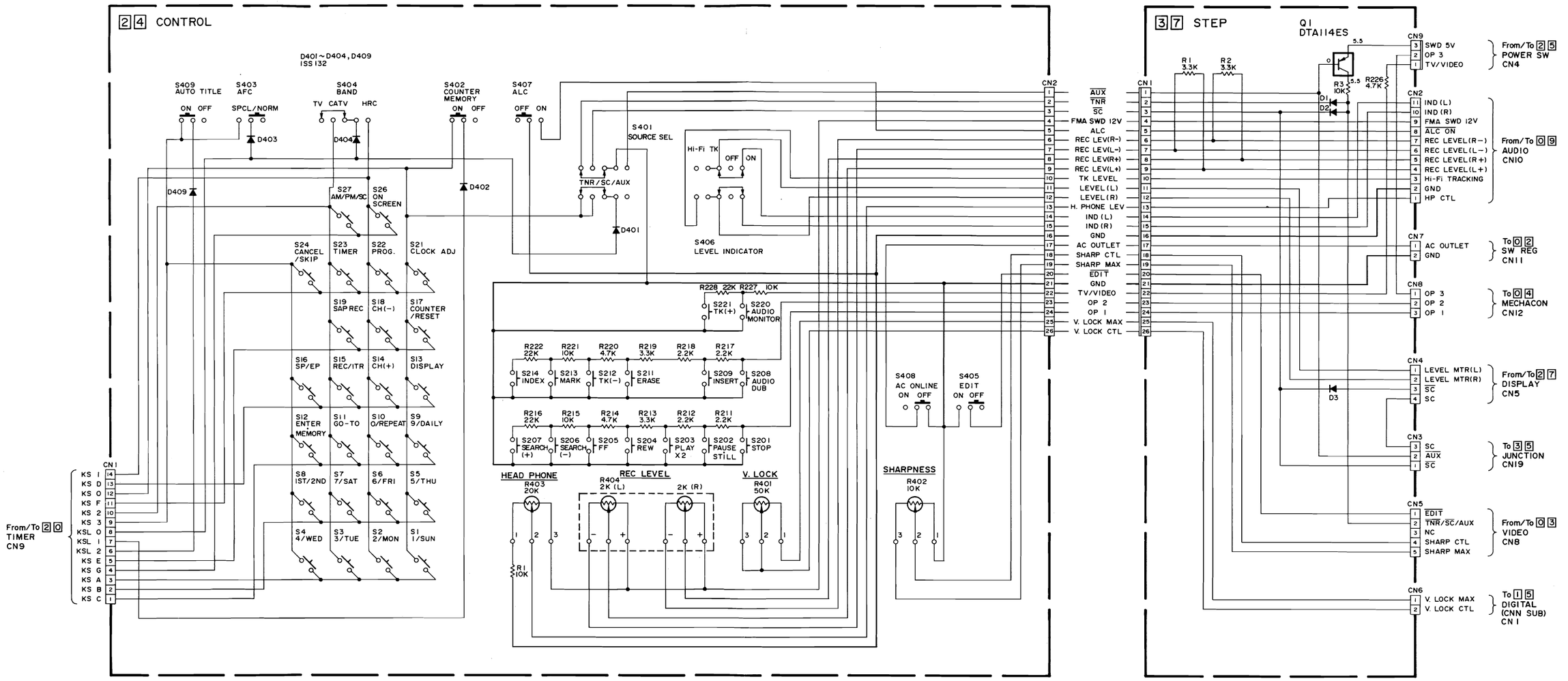
– FLYING ERASE –



– LED –



3.37 CONTROL AND STEP SCHEMATIC DIAGRAMS



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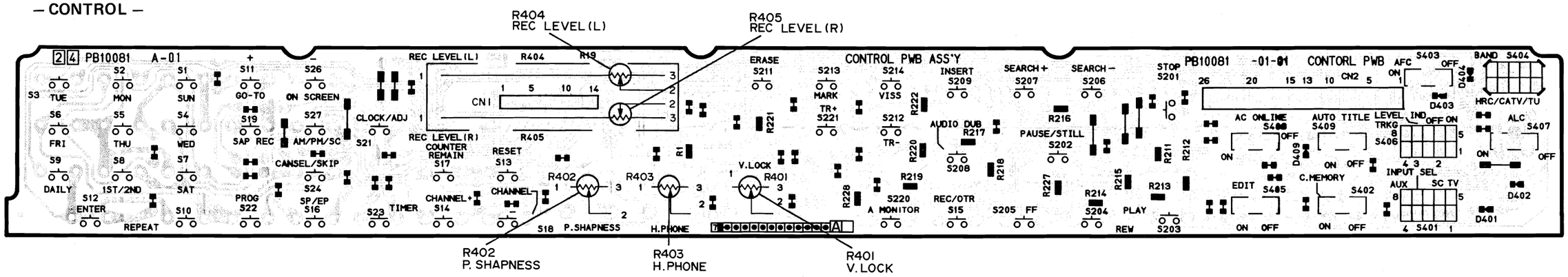
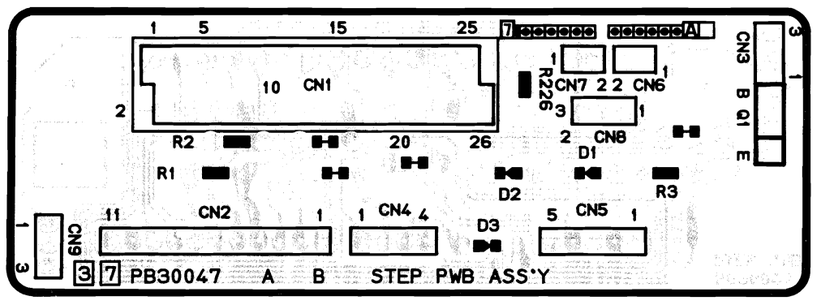
3.38 CONTROL AND STEP CIRCUIT BOARDS

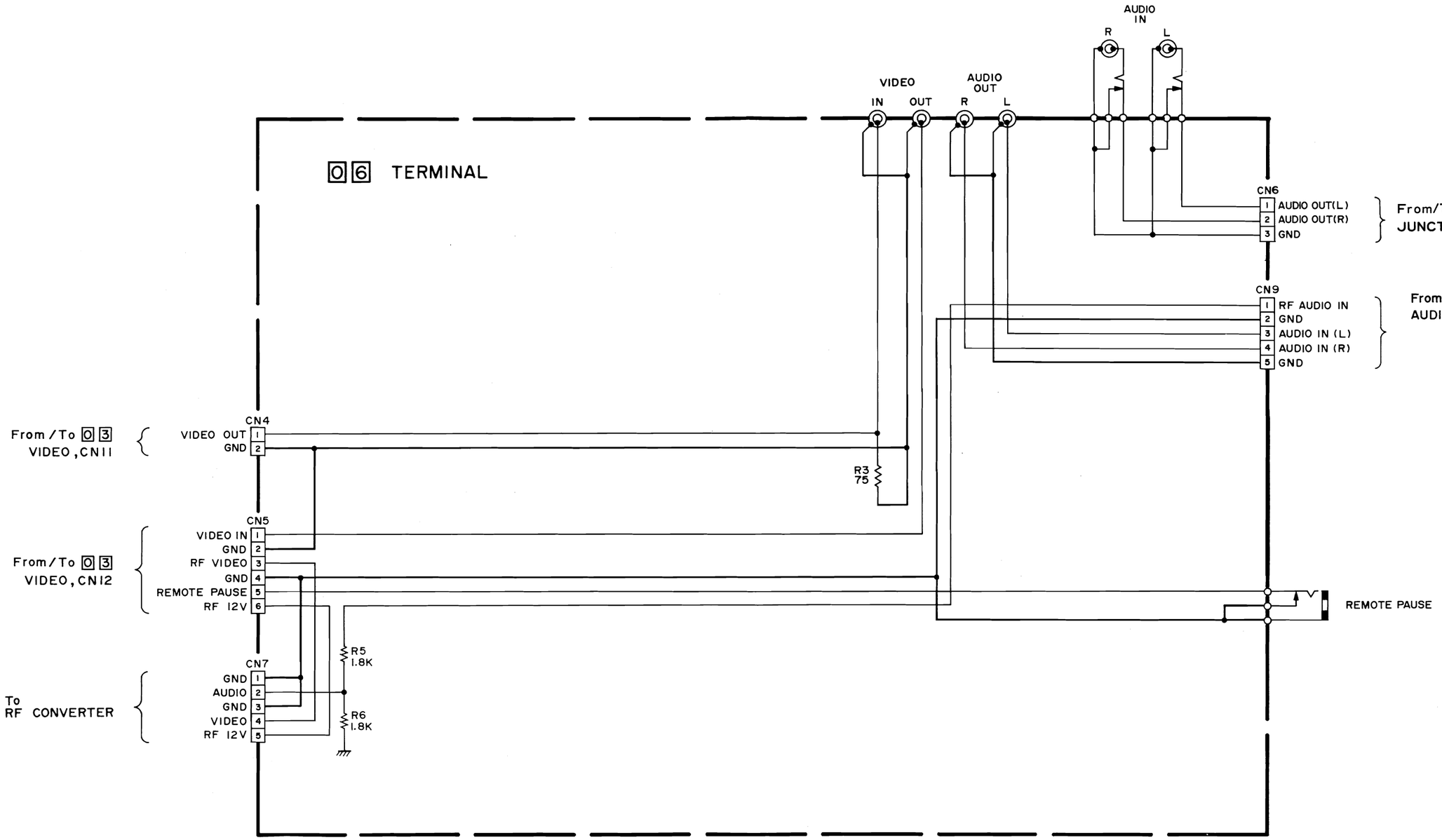
– CONTROL –



– STEP –



3.39 TERMINAL SCHEMATIC DIAGRAM



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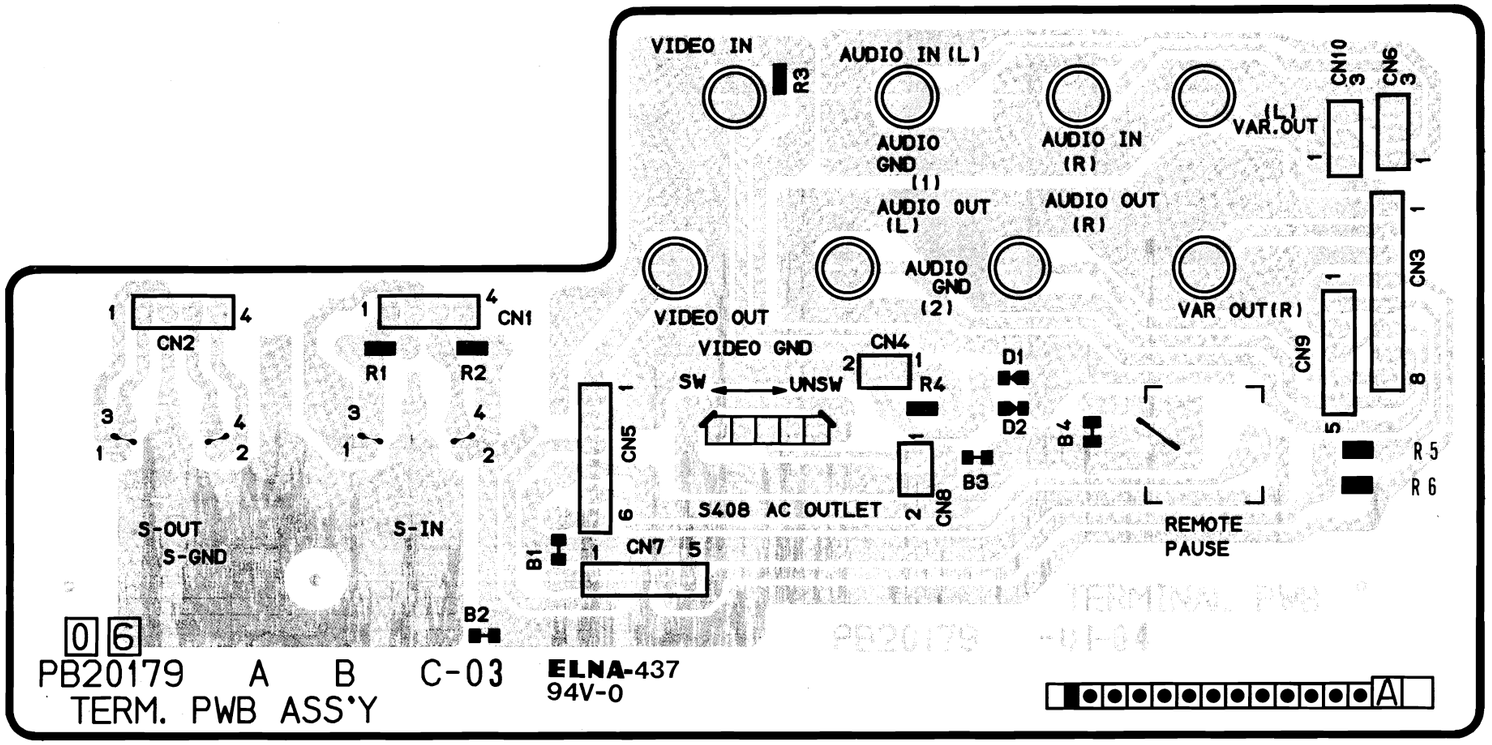
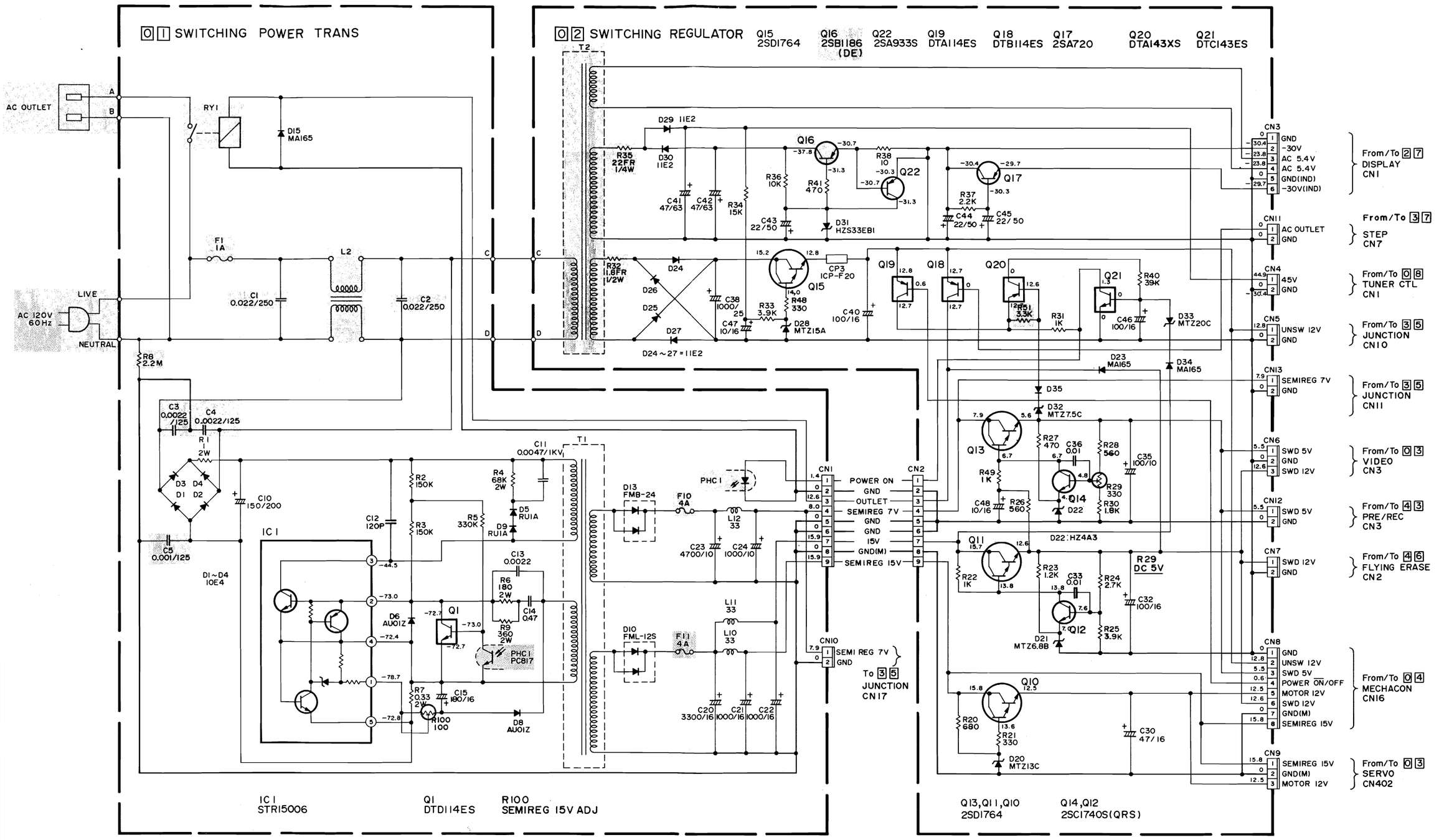
3.40 TERMINAL CIRCUIT BOARD



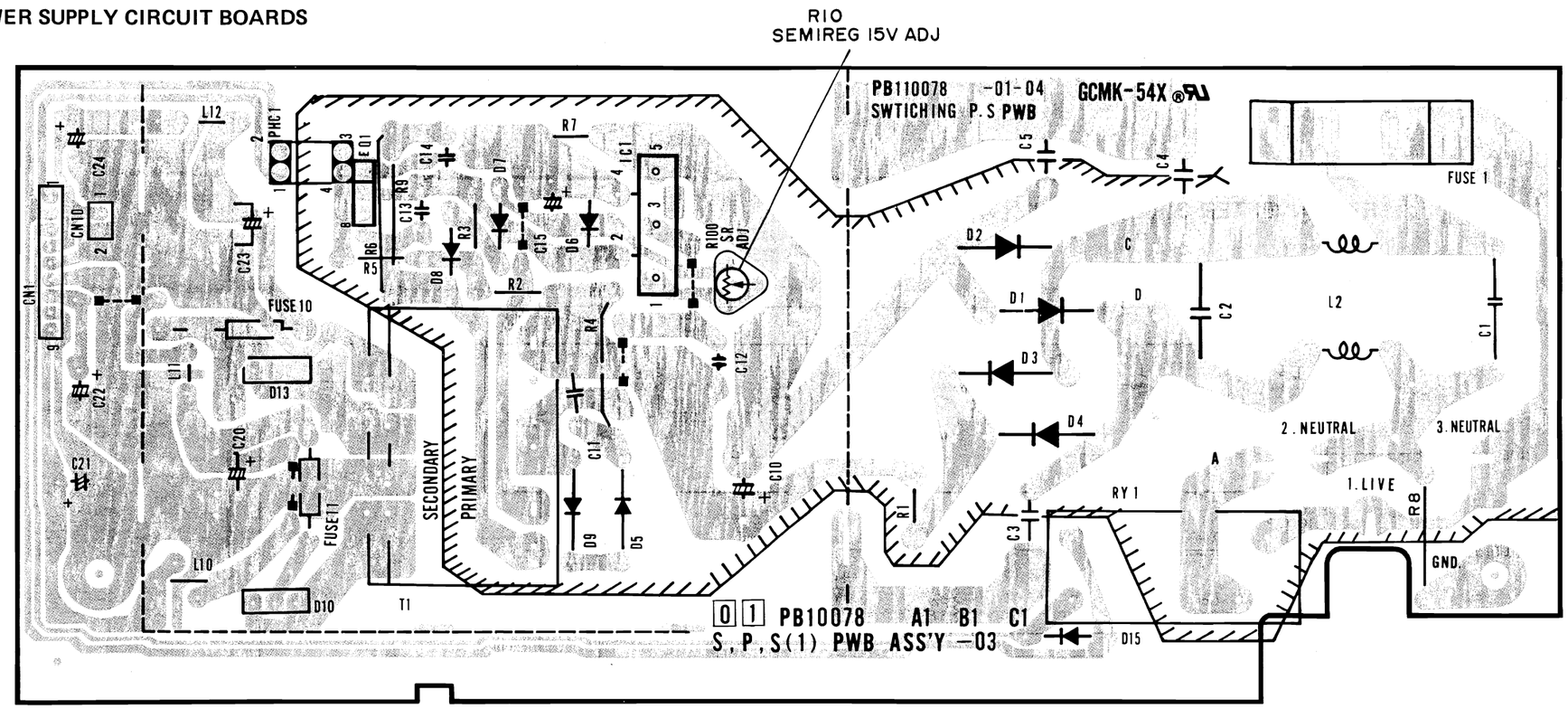
3.41 SWITCHING POWER SUPPLY SCHEMATIC DIAGRAMS

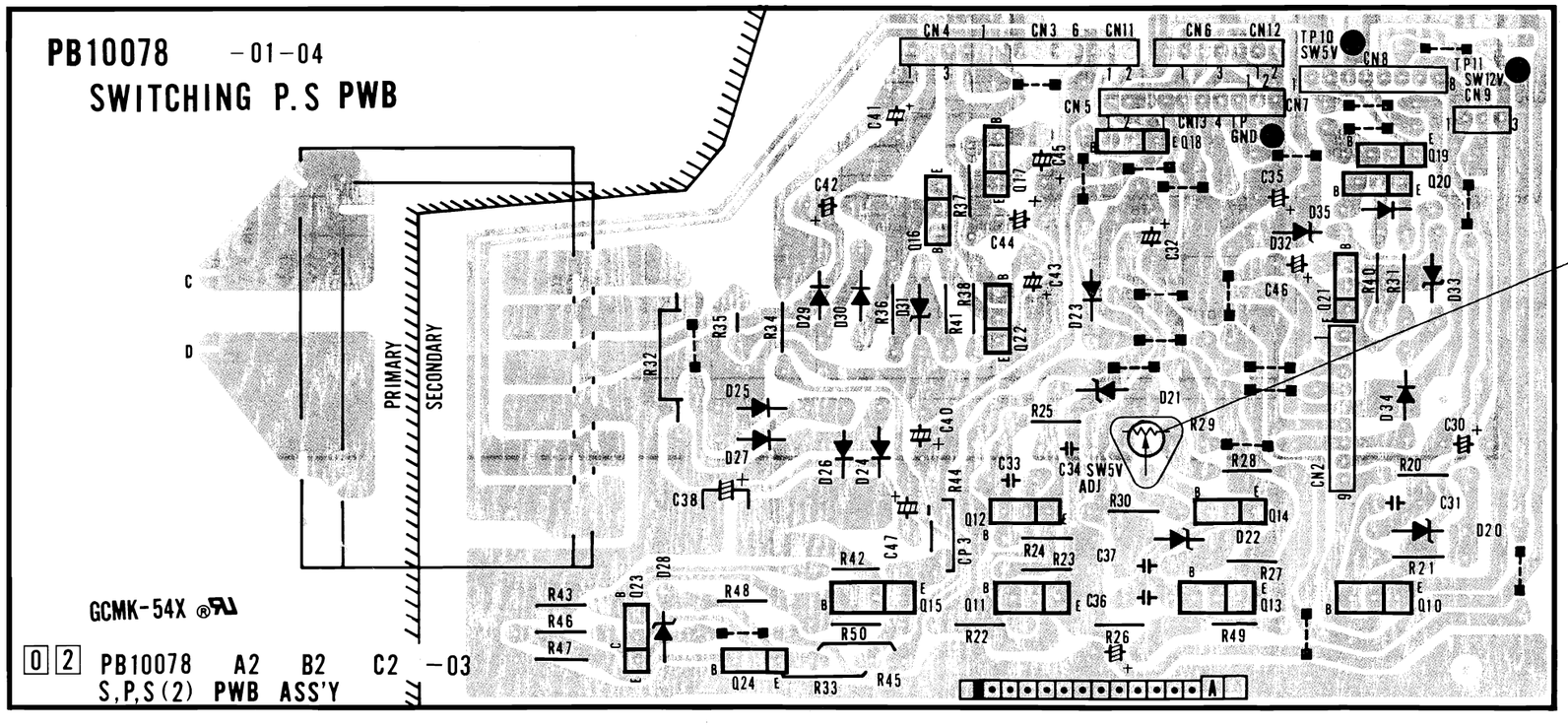


Note: Voltages are DC-measured with a digital voltmeter during stop mode.

3-46

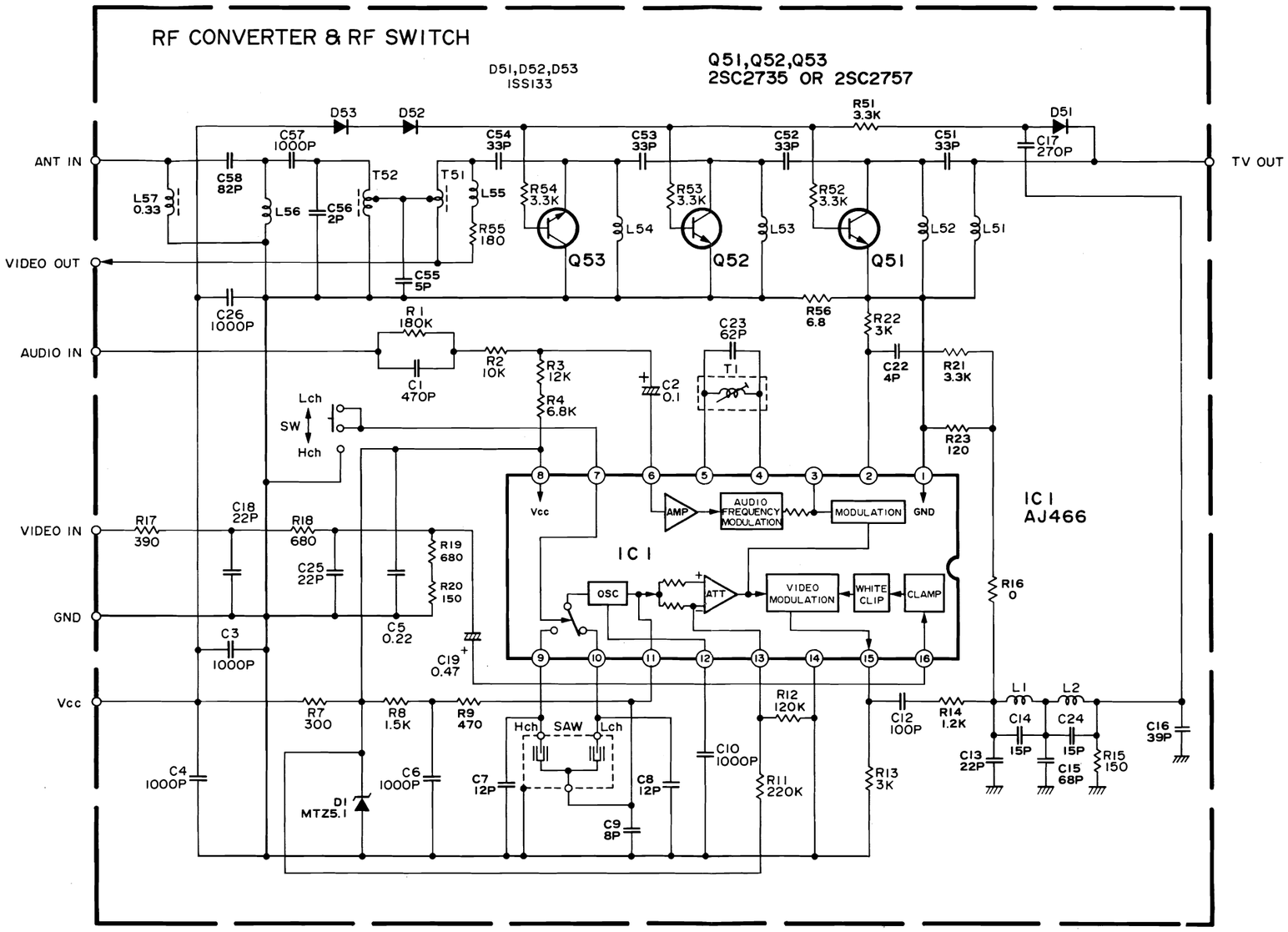
3.42 SWITCHING POWER SUPPLY CIRCUIT BOARDS





3-47

3.43 RF CONVERTER & RF SWITCH SCHEMATIC DIAGRAM

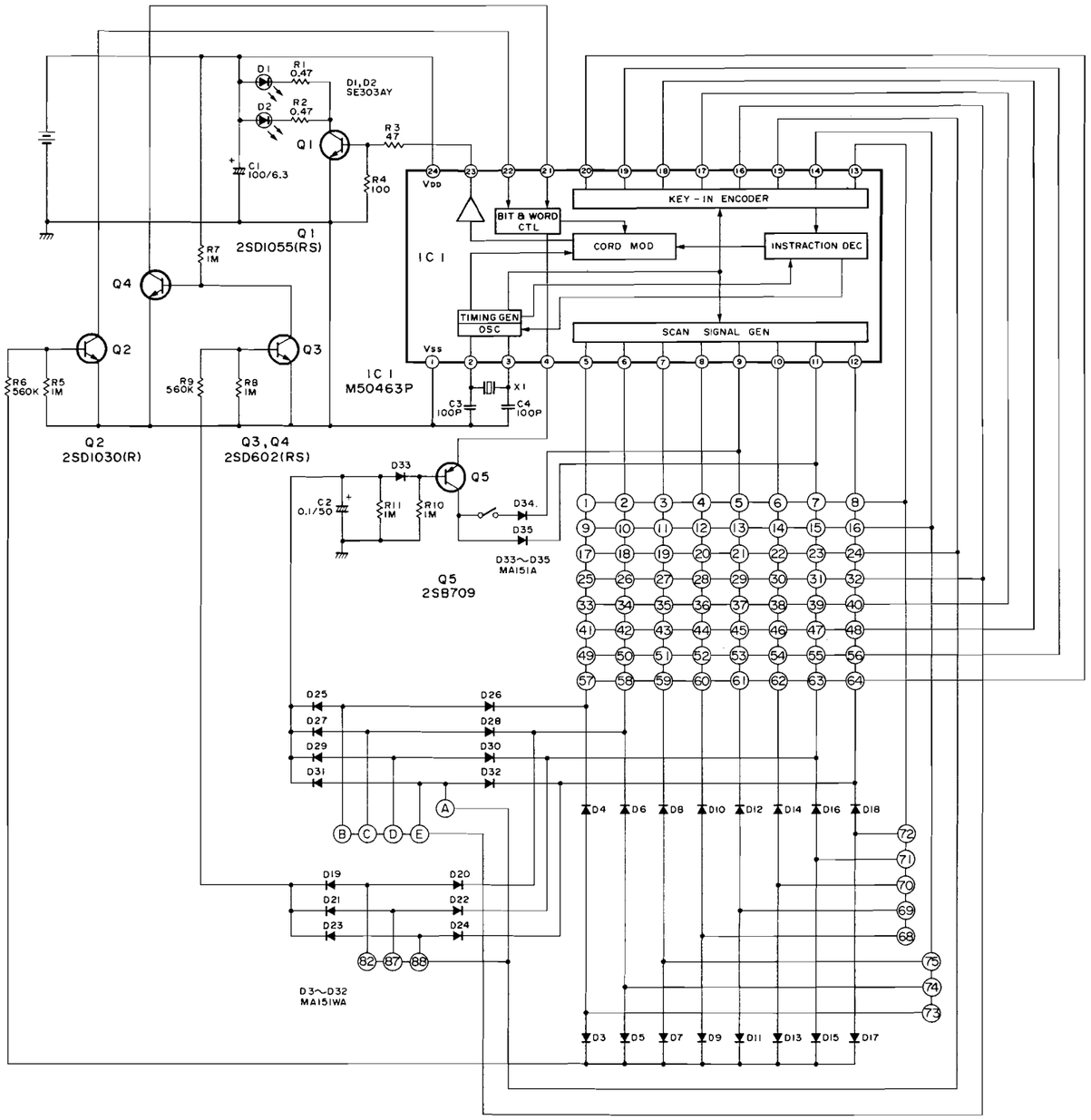


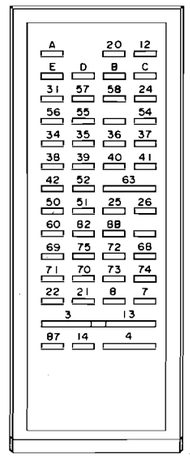
Notes: 1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
Avoid replacing individual parts.
Replace the entire unit only.

3-48

3.44 REMOTE CONTROL SCHEMATIC DIAGRAM

KEY NO.	FUNCTION
	REC + PAUSE
	REC + PLAY
E	TV VOL −
D	TV VOL +
C	TV CH ^
B	TV CH v
A	TV POWER
88	INTRO
87	SKIP SEARCH
82	INDEX
75	MULTI SCREEN
74	SWAP
73	P IN P
72	STROBE SPEED
71	ZOOM UP
70	ART
69	DIGITAL MEMORY
68	DIGITAL OFF
63	ENTER
60	GO-TO
58	COUNTER RESET
57	DISPLAY
56	PROGRAM
55	CANCEL
54	TIMER
52	0 REPEAT
51	AM/PM/SIMUL
50	SP/EP
42	9 DAILY
41	8 2ND
40	7 SAT
39	6 FRI
38	5 THU
37	4 WED
36	3 TUE
35	2 MON
34	1 SUN
31	ON SCREEN
26	BACK CH +
25	NEXT-VIDEO
24	AUDIO MONITOR
22	VARIABLE SEARCH ≪
21	VARIABLE SEARCH ≫
20	TV / VIDEO
14	PAUSE/STILL ▮▮
13	PLAY / X2 ▶
12	VIDEO POWER
8	REW ◀◀
7	FF ▶▶
4	STOP ■
3	REC ●

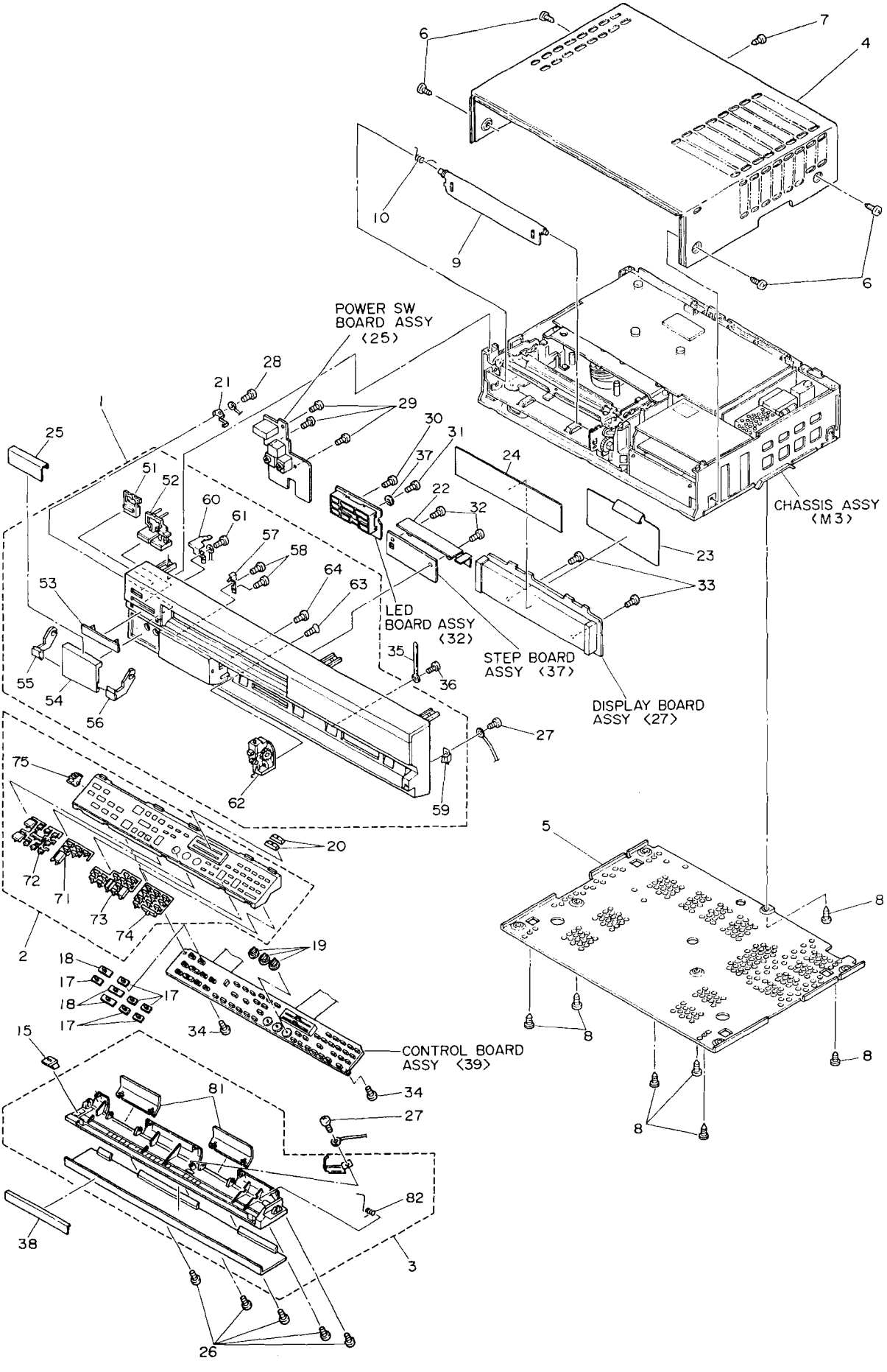




REMOCON

Notes: 1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
Avoid replacing individual parts.
Replace the entire unit only.

4.2 CABINET ASSEMBLY <M2>



SECTION 4
EXPLODED VIEWS AND PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

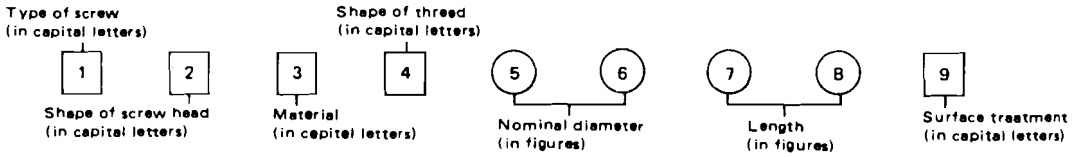
NOTE:

[M] indicates mechanical symbol number.

4.1 STANDARD PART NUMBER CODING

4.1.1 Screw coding

Standard screw part numbers are as follows.

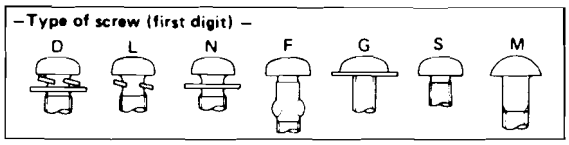


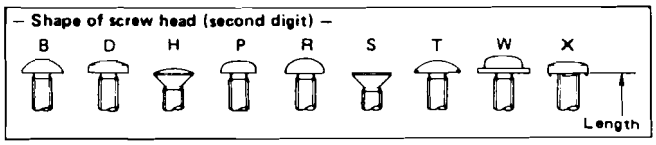
Type of screw (first digit)

- S Normal screws
- D Assembled machine screws (with plain and spring washers)
- L " (with spring washer)
- N " (with plain washer)
- F Feather screws
- G Washer head tapping screws
- M Wood screws

Shape of screw head (second digit)

- B Brazier head
- D Binding head
- H Oval countersunk head
- P Pan head
- R Round head
- S Flat head
- T Truss head
- W Washer head (machine screws)
- X Toothed head



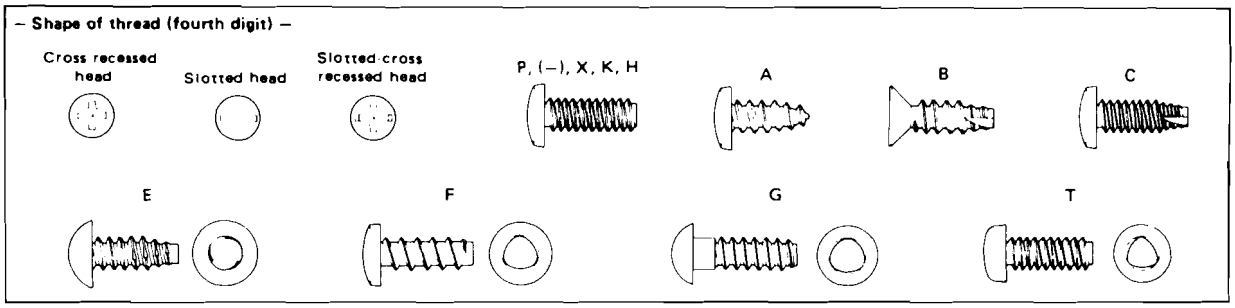


Material (third digit)

- S Steel
- E Stainless steel
- C Cast iron
- U Copper
- B Brass
- P Phosphor bronze
- N Nickel silver
- Y Cast brass
- A Aluminum
- Z Zinc alloy
- K Polycarbonate

Shape of thread (fourth digit)

- P Cross recessed head screws
- (–) Slotted head machine screws
- X Slotted-cross recessed head machine screws
- K Cross recessed head machine screws for precision equipment (type 1)
- H " (type 3)
- A Cross recessed head tapping screws (type 1)
- B " (type 2)
- C " (type 3)
- E Cross recessed head special tapping screws (brand : evertight)
- F " (brand : P-tight)
- T " (brand : taptight)
- G "



Nominal diameter (fifth and sixth digits)

The fifth and sixth digits indicate a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

Length (seventh and eighth digits)

The seventh and eighth digits indicate length in millimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

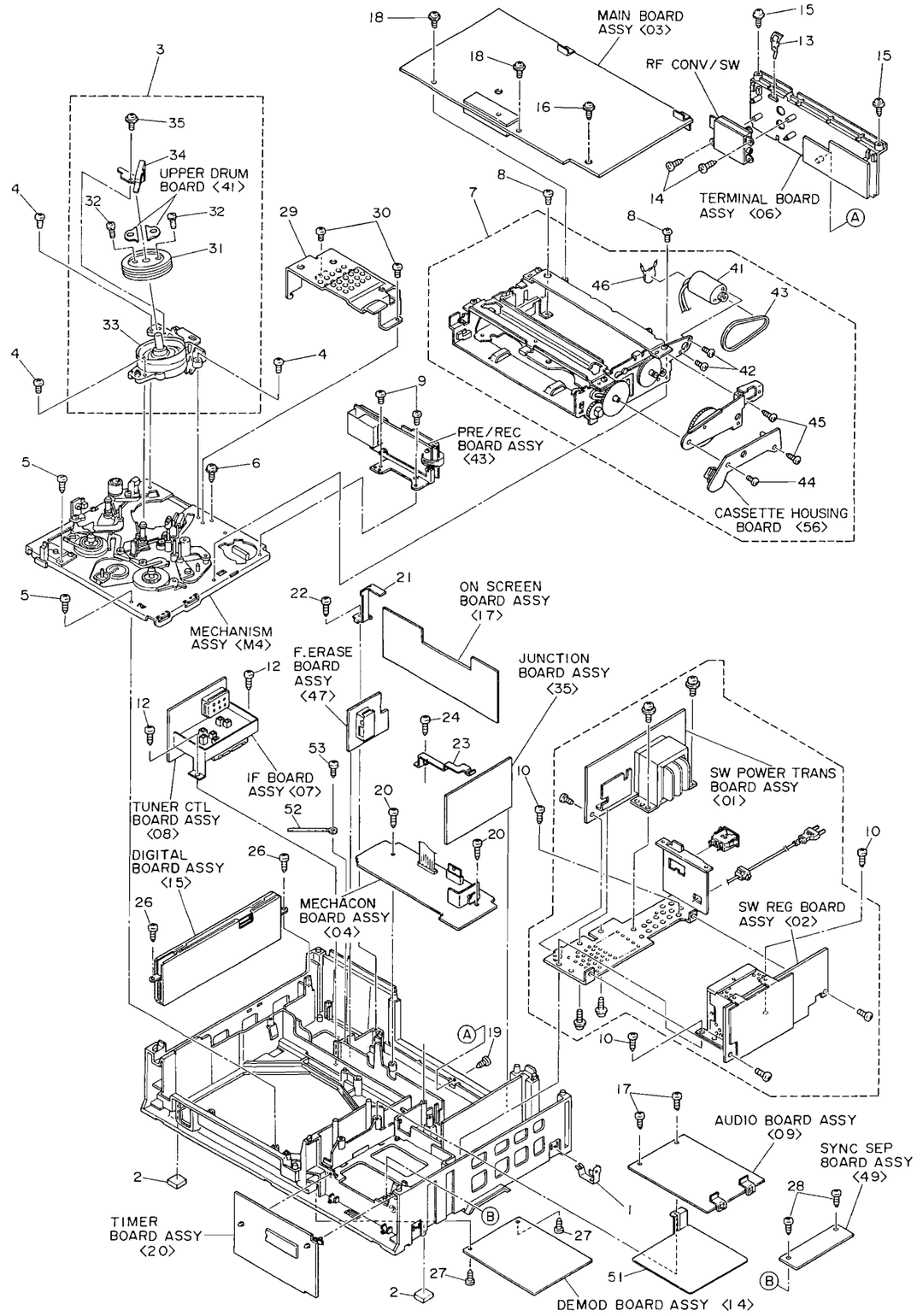
Surface treatment (ninth digit)

- Z Dichromate treatment after galvanizing (MFZn II-C)
- N Nickel plating (MFNi II, MFNi I)
- R Chromium plating (MBCr II, MBCr I)
- G Silver plating (SP4)
- B Black coating after plating
- F Blackening of iron (FB)
- M Blackening after galvanizing
- K Pickling of brass (PF2)
- P Phosphate treatment
- W Uni-chrome plating
- L Coated with transparent paint
- A Colored red after galvanizing (MFZn II-C)
- C Colored blue after galvanizing (MFZn II-C)
- T Colored green after galvanizing (MFZn II-C)
- V Colored purple after galvanizing (MFZn II-C)

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
			2. CABINET ASSEMBLY <M2>
	1	PQ10496H-16	FRONT PANEL ASSY,INCL.51-64
	2	PQ20542B-2	CONTROL PANEL ASSY,INCL.71-75
	3	PQ20545B-3	COVER ASSY,INCL.81-82
	4	PQ10545-3	TOP COVER
	5	PQ10579	BOTTOM COVER
	6	SOSA4014M	TAPPING SCREW,X4
	7	SDSF3010M	TAPPING SCREW
	8	SDSF3008Z	TAPPING SCREW,X5
	9	PQ31819-12	C.HOUSING DOOR
	10	PQ42410-1-1	TORSION SPRING
	15	PQ43153-3	BUTTON
	17	PQ43063-1-2	KNOB,X6
	18	PQ43064-1-2	KNOB,X3
	19	PQ43065-1-3	KNOB,X3
	20	PQ43066	KNOB,X2
	21	PQ43157	EARTH PLATE
	22	PQ31979	WIRE CLAMP
	23	PQ31967	PROTECTOR
	24	PQ31335	FDP FILTER
	25	PQ43280	PROTECTOR
	26	SDSF2005M	TAPPING SCREW,X5
	27	SDSF2606Z	TAPPING SCREW,X2
	28	SOSF2005Z	TAPPING SCREW
	29	SDSF2608Z	TAPPING SCREW,X3
	30	SDSF2608Z	TAPPING SCREW
	31	SDSF2614Z	TAPPING SCREW
	32	SDSF2608Z	TAPPING SCREW,X2
	33	SDSF2608Z	TAPPING SCREW,X2
	34	SDSF2005Z	TAPPING SCREW,X2
	35	PU49485-3	WIRE CLAMP
	36	SDSF2605Z	TAPPING SCREW
	37	PQM30017-24	SLIT WASHER
	38	PQ43213	SPACER
	51	PQ43057E	BUTTON ASSY
	52	PQ31763-6	BUTTON
	53	PQ43058	IR WINDOW
	54	PQ31768-5	DOOR
	55	PQ31769	ARM(L)
	56	PQ31770	ARM(R)
	57	PQ31821	STOPPER
	58	SDSF2005Z	TAPPING SCREW,X2
	59	PQ43061-1-1	EARTH PLATE
	60	PQ31949	EARTH PLATE
	61	SDSF2606Z	TAPPING SCREW
	62	PU60047-1-5	DAMPER UNIT ASSY
	63	SSSB2606Z	TAPPING SCREW
	64	SDSF2606Z	TAPPING SCREW
	71	PQ20528-2	BUTTON(R.ACC.)
	72	PQ20543	BUTTON(OPE.)
	73	PQ20544	BUTTON(PROG.)
	74	PQ20459-3	BUTTON(TENKEY)
	75	PQ43059	BASE
	81	PQ31777-2	DOOR,X2
	82	PQ43189-1-1	SPRING

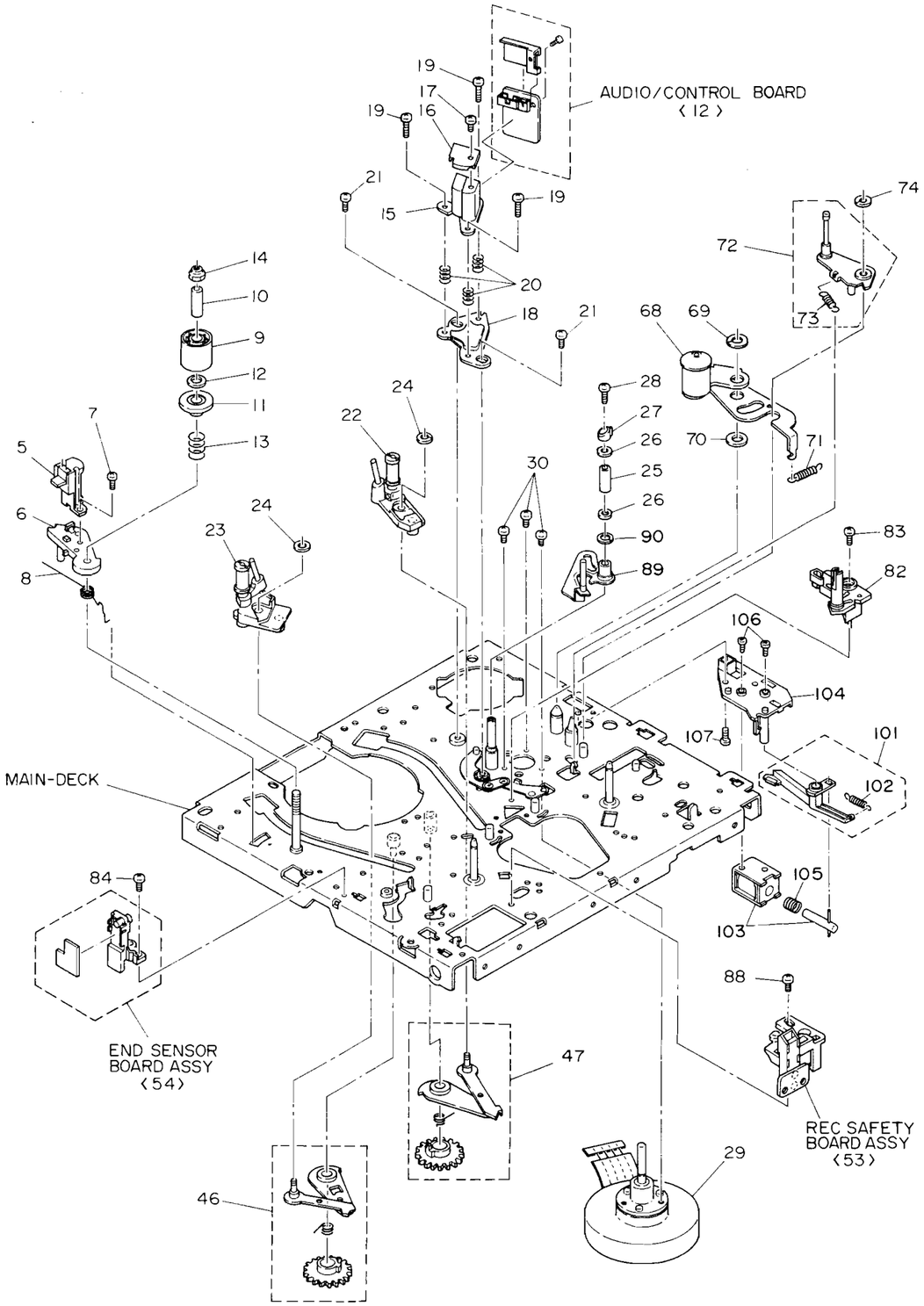
#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
			3. CHASSIS ASSEMBLY <M3>
	1	PQ43023-2	EARTH PLATE
	2	PQ43013	FOOT,X2
⚠	3	PDV2119A	DRUM ASSY,INCL.31-35
	4	SDSP2608Z	SCREW,X3, DRUM
	5	SDSA4014Z	TAPPING SCREW,X2, M.DECK
	6	PQ41396	SPECIAL SCREW, M.DECK
	7	PUS28277H	CASS.HOUSING ASSY,INCL.41-46
	8	SDST2605Z	TAPPING SCREW,X2, C.HOUSING
	9	SDST2605Z	TAPPING SCREW,X2, P REC BOARD
	10	SOSA4012Z	TAPPING SCREW,X3,TRANS BRACKET
	12	SOSF3008Z	TAPPING SCREW,X2, TUNER UNIT
	13	PQ43012	EARTH PLATE, RF CON
	14	SDST3006Z	TAPPING SCREW,X2, RF CON
	15	GPSF2610Z	TAPPING SCREW,X2, TERMIN BOARD
	16	GPSF2610Z	TAPPING SCREW, MAIN BOARD
	17	SDSF3008Z	TAPPING SCREW,X2, FMA BOARD
	18	GPST2608Z	TAPPING SCREW,X2, MAIN BOARD
	19	SDSF3010M	TAPPING SCREW, TERMINAL BOARD
	20	SDSF3008Z	TAPPING SCREW,X2,M.CTL BOARD
	21	PQ43297	BRACKET, OSC BOARD
	22	SDSF3008Z	TAPPING SCREW, OSC BOARD
	23	PQ43301	BRACKET(2), JUNCTION BOARD
	24	SDSF3008Z	TAPPING SCREW, JUNCTION BOARD
	26	SDSF3008Z	TAPPING SCREW,X2,DIGITAL BOARD
	27	SDSF3008Z	TAPPING SCREW,X2, DEMODU BOARD
	28	SDSF3008Z	TAPPING SCREW,X2, SYNC BOARD
	29	PQ31171-2-7	D.SHIELD
	30	SDST2605Z	TAPPING SCREW,X2, D.SHIELD
	31	PDM2083B	UPPER DRUM ASSY
	32	PDM4001A	DRUM SCREW ASSY,X2
	33	PDM2035R	LOWER DRUM MOTOR ASSY
	34	PDM4015B	BRUSH ASSY
	35	LPSP2606Z	SCREW
⚠	41	PQ42385A	CASSETTE MOTOR ASSY
⚠	OR	PQ42385B	CASSETTE MOTOR ASSY
	42	SPSP2603Z	SCREW,X2
	43	PQM30003-19	BELT
	44	SPSP2604Z	SCREW
	45	SPST2605Z	TAPPING SCREW,X2
	46	DV710SR223M16	VARISTOR
	51	PQ32255A	SHIELD PLATE ASSY
	52	PU49485-4	WIRE CLAMP
	53	SDSF3008Z	TAPPING SCREW

4.3 CHASSIS ASSEMBLY <M3>

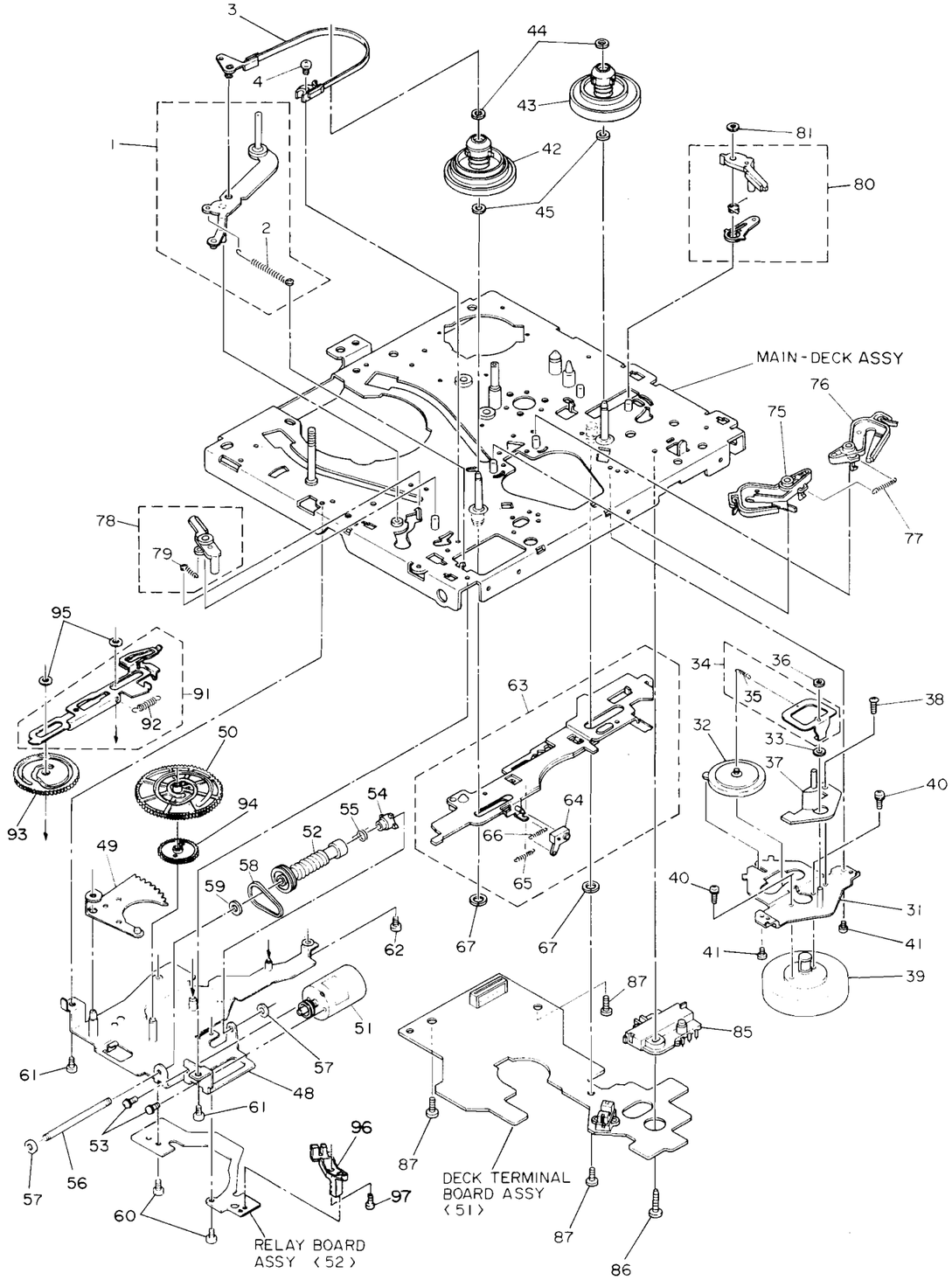


4-3

4.4 MECHANISM ASSEMBLY (1) [M4]



MECHANISM ASSEMBLY (2) [M4]

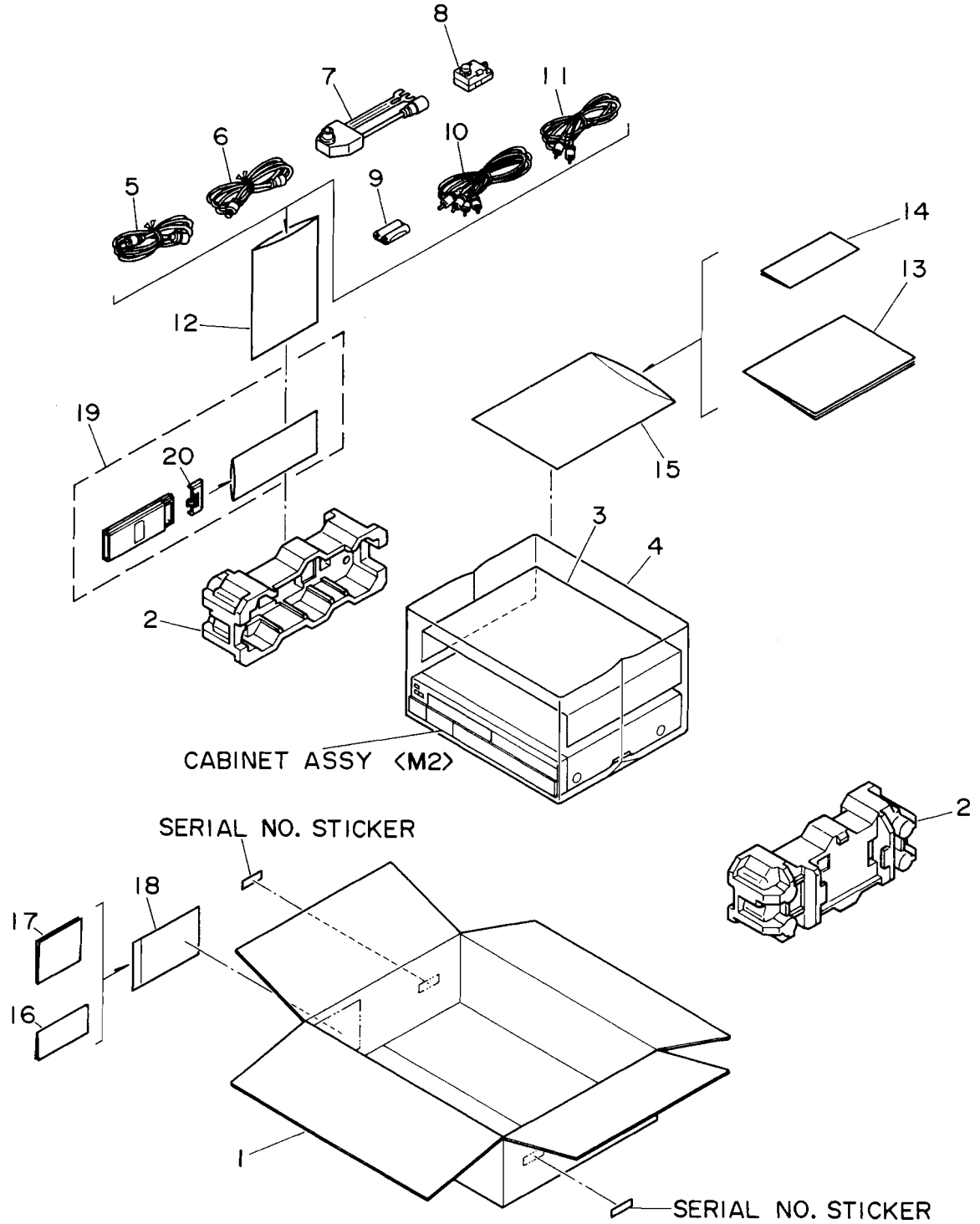


4-4

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
			**********
			**********
			* 4. MECHANISM ASSEMBLY <M4> *
			**********
	1	PQ41944A-7	TENSION ARM ASSY,INCL.2
	2	PQ41952-3	SPRING
	3	PQ41948A	TENSION BAND ASSY
	4	SDST2606Z	TAPPING SCREW
	5	PU57641-2	FULL ERASE HEAD
	6	PQ31036	FULL ERASE HEAD BASE
	7	SPSG2606Z	TAPPING SCREW
	8	PQ41954-1-1	TORSION SPRING
	9	PQ41955	IMPEDANCE ROLLER
	10	PQ41956	COLLAR
	11	PQ41957	LOWER FLANGE
	OR	PQ42958	LOWER FLANGE
	12	PQM30018-39	SPACER
	OR	PQM30018-50	SPACER
	13	PQM30002-124	COMPRESSION SPRING
	14	PQ40353	NYLON NUT
	15	PU59927-4	AUDIO/CONTROL HEAD
	16	PQ42985	SHIELD CAP
	17	HPSP1710N	SCREW
	18	PQ42984-2	HEAD BASE
	19	SPSP2608Z	SCREW,X3
	20	PU30080-49	SPRING,X3
	21	SDSP2606Z	SCREW,X2
	22	PQ41963A-2	POLE BASE ASSY (TU)
	OR	PU59994	POLE BASE ASSY(TU)
	23	PQ41969A-2	POLE BASE ASSY (SUP)
	OR	PU59993	POLE BASE ASSY(SUP)
	24	PQM30017-5	SLIT WASHER,X2
	25	PU53629-3	TAPE GUIDE
	26	PQ40268-2	GUIDE FLANGE,X2
	27	PQ42999-2	GUIDE POLE CAP
	28	SDSP2006Z	SCREW
⚠	29	PU60201V	CAPSTAN MOTOR
⚠	OR	PU58635M	CAPSTAN MOTOR
	30	SPSP2605N	SCREW,X3
	31	PQ41974A-3	REEL MOTOR BRACKET ASSY
	32	PU58645-1-4	IDLER ARM
	33	Q03093-834	WASHER
	34	PQ41976A-1	SPRING ARM ASSY,INCL.35
	35	PQ42212-1-4	SPRING
	36	PQM30017-22	SLIT WASHER
	37	PQ41978	HOLDER
	38	SPST2606Z	TAPPING SCREW
⚠	39	PU59926V	REEL MOTOR
	40	LPSP2604Z	SCREW,X2
	41	SPST2606Z	SCREW,X2
	42	PU59250-1-2	REEL DISK (SUP)
	43	PU58638-1-2	REEL DISK (TU)
	44	PQM30017-5	SLIT WASHER,X2
	45	Q03093-828	WASHER,X2
	46	PQ41979A-4	LOADING ARM ASSY (SUP)
	47	PQ41985B	LOADING ARM ASSY (TU)
	48	PQ42973A	CAM BRACKET SUB ASSY
	49	PQ41994A-3	ARM GEAR ASSY
	50	PQ20428	CONTROL CAM

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
⚠	51	PQ41996A	MODE MOTOR ASSY
	52	PQ41998A	WORM GEAR ASSY
	53	LPSP2604Z	SCREW,X2
	54	PQ42001	WINDMILL
	55	PQ42002	CLUTCH SPRING
	56	PQ42003	WORM SHAFT
	57	PQM30017-5	SLIT WASHER,X2
	58	PQM30003-20	BELT
	59	PQM30018-22	SPACER
	60	SPST2606Z	TAPPING SCREW,X2
	61	SPST2606Z	TAPPING SCREW,X2
	62	SPSP2603Z	SCREW
	63	PQ42038B	PLATE ASSY,INCL.64-66
	64	PQ31044-1-2	LOCK LEVER
	65	PQM30001-223	TENSION SPRING
	66	PQM30001-211	TENSION SPRING
	67	PQM30017-28	SLIT WASHER,X2
	68	PQ42006B	PINCH ROLLER ARM ASSY
	69	PQM30017-28	SLIT WASHER
	70	Q03093-833	WASHER
	71	PQM30001-193	TENSION SPRING
	72	PQ42013B-4	GUIDE ARM ASSY,INCL.73
	73	PQ42029	SPRING
	74	PQM30017-6	SLIT WASHER
	75	PQ42019B-6	MAIN BRAKE ASSY (SUP)
	76	PQ42020B	MAIN BRAKE ASSY (TU)
	77	PQM30001-216	TENSION SPRING
	78	PQ42021A-3	SUB BRAKE ASSY (SUP),INCL.79
	79	PQ42023-1-2	TENSION SPRING
	80	PQ42037A-2	SUB BRAKE ASSY (TU)
	81	PQM30017-6	SLIT WASHER
	82	PU59925-1-1	LED HOLDER
	83	SPST2606Z	TAPPING SCREW
	84	SPST2606Z	TAPPING SCREW
	85	PU59924	SLIDE ENCODER
	86	SDSP2610Z	SCREW
	87	SDSP2606Z	SCREW,X3
	88	SDST2606Z	TAPPING SCREW
	89	PQ42979A-2	HALF LOADING ARM ASSY
	90	PQM30017-29	SLIT WASHER
	91	PQ42974A	SLIDE CAM PLATE ASSY,INCL.92
	92	PQM30001-224	SPRING
	93	PQ31677	HALF LOADING CAM
	94	PQ42963	SECOND GEAR
	95	PQM30017-24	SLIT WASHER,X2
	96	PU59251-1-2	REEL SENSOR (SUP)
	97	SPSP2603Z	SCREW
	101	PQ42596A	BRAKE ASSY,INCL.102
	102	PQM30001-212	TENSION SPRING
⚠	103	PU59401-2	SOLENOID
⚠	DR	PU60475-2	SOLENOID
	104	PQ31380-1-4	BRAKE BASE
	105	PQM30002-187	COMP. SPRING
	106	SPSP2005Z	SCREW,X2
	107	SDST2608Z	TAPPING SCREW

4.5 PACKING ASSEMBLY <M1>



#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
**********			
		**********	
		* 1. PACKING ASSEMBLY <M1> *	
		**********	
	1	PQ32158-7	PACKING CASE,CANADA
		PQ32158-5	PACKING CASE,U.S.A.
	2	PQ32157A-1	CUSHION ASSY
	3	PQ41026-13	PROTECT SHEET
	4	PQM30021-69	POLY BAG
⚠	5	PU59168-2	RF CABLE
⚠	OR	PU59167-2	RF CABLE
⚠	6	PU59167-4	RF CABLE
⚠	7	PU59610	ANTENNA SPLITTER
⚠	8	PU35613-2	MATCHING TRANSFORMER
⚠	OR	PU59135-2	MATCHING TRANSFORMER
	9	UM-4NJ2P	BATTERY(X2)
	10	PU56142-3	PIN CORD ASSY
	11	PU59205-3	PIN JACK CABLE
	12	QPGA020-02003	POLY BAG
⚠	13	PU30425-954	INSTRUCTIONS,CANADA
⚠		PU30425-953	INSTRUCTIONS,U.S.A.
	14	BT-20071A	INSTRUCTION GUIDE,CANADA
	15	QPGA025-03505	POLY BAG
	16	BT-20046C	TOLL FREE CARD,U.S.A.
	17	BT-20025J	WARRANTY CARD,CANADA
		BT-20062	WARRANTY CARD,U.S.A.
	18	PU54821	POLY BAG
⚠	19	PQ10544D-5	REMOTE CONTROLLER,INCL.20
	20	PQ31907	BATTERY CAP

SECTION 5
ELECTRICAL PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS– All resistance values are in ohms (Ω), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precision Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

CAPACITORS–All capacitance values are in μF, unless otherwise indicated.

pF	: μμF (Pico farad)
C Cap	: Caramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metalized Mylar Capacitor
MP Cap	: Metalized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

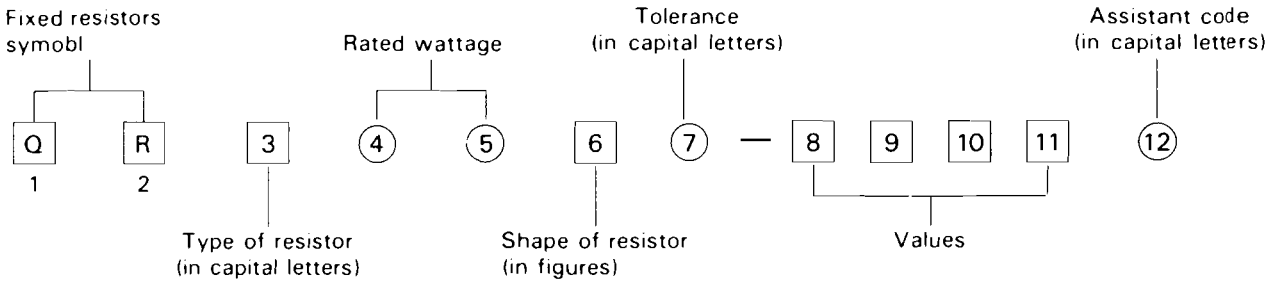
NOTES:

- [2 digits] indicates circuit board symbol number.
- "X " indicates quantity per set.

5.1 STANDARD PART NUMBER CODING

5.1.1 Fixed resistor coding

Fixed resistor part numbers are as follows.



Type of resistor (third digit)

C	Composition resistors
D	Carbon film resistors
F	Unflammable resistors
G	Oxide metal film resistors
H	Fusible resistors
M	Metal plate resistors
S	Metal glazed resistors
V	Precision metal film resistors
W	Wire wound resistors
X	Metal film resistors
Z	Special resistors

Rated wattage (fourth and fifth digits)

A0	1/10 W
18	1/8 W
16	1/6 W
14	1/4 W
12	1/2 W
01	1 W
02	2 W
03	3 W
04	4 W
05	5 W
06	6 W
07	7 W
75	7.5 W
08	8 W
10	10 W
15	15 W
A6	16 W
20	20 W
30	30 W

Tolerance (seventh digit)

F	± 1 %
G	± 2 %
J	± 5 %
K	± 10 %
M	± 20 %

Assistant code (twelfth digit)

A	Small type
B	Small type
S	Small type
Y	Lead taping
Z	Lead taping

Values (eighth – tenth or eleventh digits)

examples:

R47		0.47 Ω
4R7		4.7 Ω
470	47×10^0	47 Ω
471	47×10^1	470 Ω
472	47×10^2	4.7 kΩ
473	47×10^3	47 kΩ
474	47×10^4	470 kΩ
475	47×10^5	4.7 MΩ

QRV resistance shown by four digits:

4640	464×10^0	464 Ω
4641	464×10^1	4.64 kΩ
4642	464×10^2	46.4 kΩ

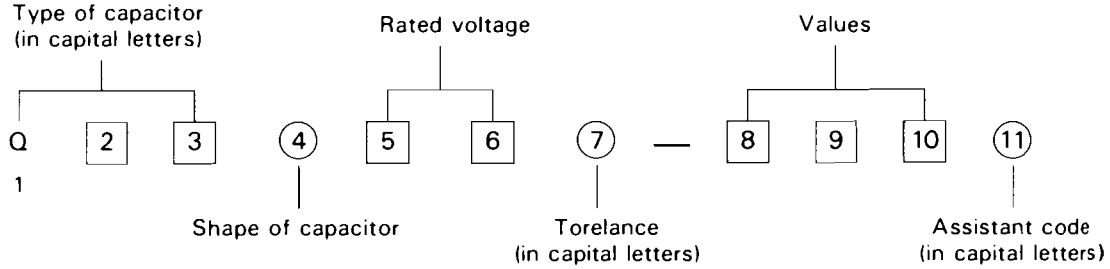
Shape of resistor (sixth digit)

Note: ■ indicates flame retardant resistor.

Shape of resistor \ Type of resistor	C	D	F	G	H	M	S	V	W	X
1										
2										
3										
4										
5									(L) type	
6										
7			Lug (B) type							
8			Lug (A) type				Chip			
9			Lug (C) type							

5.1.2 Fixed capacitor coding

Fixed capacitor part numbers are as follows.



Ceramic capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1,4	3			8,A
QCS	Temperature compensation	1	3	4	5	8,A
QCT	Temperature compensation	Special coding				8,A
QCV	Ceramic			1	3	
QCX	Ceramic			1	3	
QCY	High capacitance	1,4	3	6	7	8,A
QCZ	Special type	Special coding				
QCB	Ceramic			B	C	

Electrolytic capacitors

Type of capacitor (first-third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEB	Low leakage		4	5	6	
QEC	Low leakage		4,8,A	9,B	6,C	
QEE	Tantalum (normal)		4	5	6	
	Tantalum (small)		8			
QEF	Chip tantalum	8 (chip type)				
QEG	Low impedance		4			
QEK	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4,A	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar (small)		4,A	5,B	6,C	
QER	Miniature type		4	5	6	
QET	Small type	2	4,A	5,B	6,C	7
QEU	Small type		4	5	6	
QEV	Small type		4		6	7
QEW	Normal	2	4	5	6	7

Paper film capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
		Tubular	Normal		Flame retardant	
Symbol	Characteristics		Mono-direction	Kink lead	Mono-direction	Kink lead
QFA	Metalized polypropylene				7	
QFE	Metalized mylar				5	
QFF	Film mica		4			
QFG	Polypropylene film		4	8		
QFH	Metalized mylar	2	4	3	5,7	6
QFJ	Mylar (special)		4			
QFK	Metalized mylar (small)				5	
QFM	Mylar	2	4	3,7	5	6
QFN	Mylar (small)		4	3		
QFP	Polypropylene		4	3,8		
QFS	Polystyrole	2	4	3		
QFV	Thin film		4	8		
QFZ	Special type	Special coding				

Rated voltage (fifth and sixth digits)

Fifth digit \ Sixth digit	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15	4.0		6.3				
1	10		16	20	25		40	50	63	80	35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

Tolerance (seventh digit)

A	$^{+100}_{-10}$ %	M	±20 %
F	±1 %	N	±30 %
G	±2 %	P	$^{+100}_{-0}$ %
H	$^{+50}_{-10}$ %	R	$^{+30}_{-10}$ %
J	±5 %	X	$^{+40}_{-20}$ %
K	±10 %	Z	$^{+80}_{-20}$ %

Values (eighth – tenth digits)

Example : Values are in picofarads

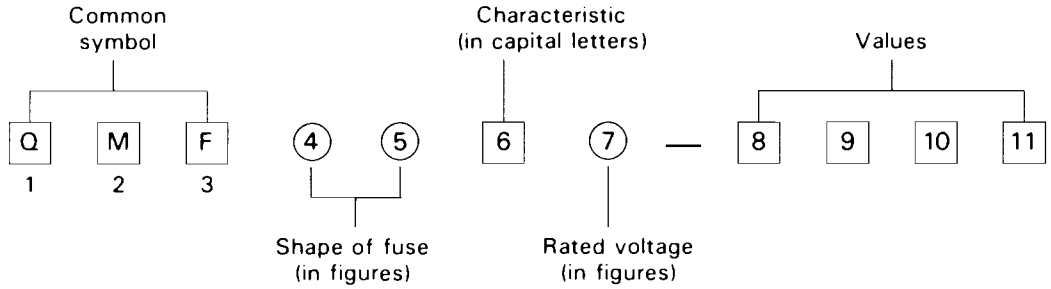
101	10×10^1 pF	100 pF
102	10×10^2 pF	1,000 pF (0.001 μF)
103	10×10^3 pF	10,000 pF (0.01 μF)
104	10×10^4 pF	100,000 pF (0.1 μF)
105	10×10^5 pF	1 μF
5R0		5.0 pF

Assistant code (eleventh digit)

G Small size
Z Lead taping
Y Lead taping

5.1.3 Fuse coding

Standard fuse part numbers are as follows.



Shape of fuse
(fourth and fifth digits)

51	ϕ5.2 × 20 mm
60	ϕ6.4 × 30 mm
61	ϕ6.35 × 31.8 mm
63	ϕ6.4 × 30 mm with lead wires
66	ϕ6.35 × 31.8 mm with lead wires
00	Special type

Rated voltage
(seventh digit)

1	AC125 V
2	AC250 V
3	0.1 – 1 A : AC250 V 1.25 – 6.3 A : AC125 V

Values
(eighth-tenth or eleventh digits)
example:

R63	..... 0.63 A
1R0	..... 1.0 A
2R5	..... 2.5 A
100	..... 10 A
R315	..... 0.315 A
1R25	..... 1.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % – 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % – 2000 %	Within 0.01 sec.	

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
			**********
			**********
			* 5. SWITCHING POWER SUPPLY B.AY <01><02> *
			**********
	PWBA	PB10078C-03	SW POWER SUPPLY BOARD ASSY
			-SWITCHING POWER TRANSFORMER B.AY <01>-
	PWBA1	PB10078C1-03	SW POWER TRANS BOARD ASSY <01>
	IC1	STR15006	IC
	Q1	DTD114ES	TRANSISTOR
⚠	PHC1	PC817	P.H.C.
	D1	10E4	DIODE
	D2	10E4	DIODE
	D3	10E4	DIODE
	D4	10E4	DIODE
	D5	RU1A	FR DIODE
	D6	AU01Z	FR DIODE
	D8	AU01Z	FR DIODE
	D9	RU1A	FR DIODE
	D10	FML-12S	FR DIODE
	OR	F6P20F	FR DIODE
	D13	FMB-24	SBD
	OR	F5KQ40B	SBD
	D15	MA165	DIODE
	OR	1SS133	DIODE
	R1	QRZ0078-1R0	WW RESISTOR
	R2	QRD181J-154	RESISTOR
	R3	QRD181J-154	RESISTOR
	R4	QRG029J-683	O.M.F RESISTOR
	R5	QRD181J-334	RESISTOR
	R6	QRG029J-181G	OMF RESISTOR
	R7	QRZ0078-R33	WW RESISTOR
⚠	R8	QRC122K-225E	RESISTOR
	R9	QRG029J-361A	O.M.F.RESISTOR
	R100	QVZ3507-101	V RESISTOR 15V ADJ
⚠	C1	QFZ9025-223	M M CAP
⚠	C2	QFZ9025-223	M M CAP
⚠	C3	QCZ9016-222M	CAPACITOR
⚠	C4	QCZ9016-222M	CAPACITOR
⚠	C5	QCZ9016-102K	CAPACITOR
	C10	QEZ0126-157	E CAPACITOR
	C11	QCY53AK-472	CAPACITOR
	C12	QCY43AK-121	CAPACITOR
	C13	QFL41HJ-222	M CAPACITOR
	C14	QFV41HJ-474	M CAPACITOR
	C15	QEZ0108-187Z	E CAPACITOR
	C20	QEZ0125-338	E CAPACITOR
	C21	QETB1CM-108	E CAPACITOR
	C22	QETB1CM-108	E CAPACITOR
	C23	QEZ0106-478	E CAPACITOR
	C24	QETA1AM-108	E CAPACITOR
⚠	L2	PU60401	LINE FILTER
	L10	PU56181-330	CHOKE COIL, 33 MICRO
	L11	PU56181-330	CHOKE COIL, 33 MICRO
	L12	PU59701-330	CHOKE COIL, 33 MICRO
⚠	RY1	PU59848	RELAY
⚠	T1	PU60402	SW. TRANS
⚠	HD1	PU57505	FUSE CLIP, X2
	HS1	PQ32130-1-2	HEAT SINK
	HS2	PQ43231	HEAT SINK(3)
	SCW1	DPSP3008Z	ASSY SCREW
	SCW2	DPSP3006Z	SCREW, X2
⚠	SCW3	DPSP2608Z	SCREW, X2
	SLD1	PQ32167	SHILD CASE(1)
⚠	SPC1	PQM30018-53	SPACER, X2

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	CN1	PU60417-9	CAP HOUSING
	CN10	PU58844-2	CAP HOUSING
⚠	F1	QMF51J2-1R0N	FUSE
⚠	F10	PU60479-4R0	MICRO FUSE
⚠	F11	PU60479-4R0	MICRO FUSE
			-SWITCHING REGULATOR B.AY <02>-
	PWBA2	PB10078C2-03	SW REGURATOR BOARD ASSY <02>
	Q10	2SD1764	TRANSISTOR
	OR	2SD1796	TRANSISTOR
	Q11	2SD1764	TRANSISTOR
	OR	2SD1796	TRANSISTOR
	Q12	2SC1740S(QRS)	TRANSISTOR
	Q13	2SD1764	TRANSISTOR
	OR	2SD1796	TRANSISTOR
	Q14	2SC1740S(QRS)	TRANSISTOR
	Q15	2SD1764	TRANSISTOR
	OR	2SD1796	TRANSISTOR
⚠	Q16	2SB1186(DE)	TRANSISTOR
	Q17	2SA720	TRANSISTOR
	Q18	DTB114ES	TRANSISTOR
	Q19	DTA114ES	TRANSISTOR
	Q20	DTA143XS	TRANSISTOR
	Q21	DTC143ES	TRANSISTOR
	Q22	2SA933S	TRANSISTOR
	D20	MTZ13C	ZENER DIODE
	D21	MTZ6.8B	ZENER DIDDE
	D22	HZ4A3	ZENER DIODE
	D23	MA165	DIODE
	OR	1SS133	DIODE
	D24	11E2	DIODE
	D25	11E2	DIODE
	D26	11E2	DIODE
	D27	11E2	DIODE
	D28	MTZ15A	ZENER DIODE
	D29	11E2	DIODE
	D30	11E2	DIODE
	D31	HZS33EB1	ZENER DIDDE
	D32	MTZ7.5C	ZENER DIODE
	D33	MTZ20C	ZENER DIODE
	D34	MA165	DIODE
	OR	1SS133	DIODE
	D35	1SS133	DIODE
	R20	QRD161J-681	RESISTOR
	R21	QRD161J-331	RESISTOR
	R22	QRD161J-102	RESISTOR
	R23	QRD161J-122	RESISTOR
	R24	QRD161J-272	RESISTOR
	R25	QRD161J-392	RESISTOR
	R26	QRD161J-561	RESISTOR
	R27	QRD161J-471	RESISTOR
	R28	QRD161J-561	RESISTOR
	R29	QVZ3521-331	V RESISTOR, +5V ADJ
	R30	QRD161J-182	RESISTOR
	R31	QRD161J-102	RESISTOR
⚠	R32	QRH127K-1R8	FUSIBLE RESISTOR
	R33	QRD161J-392	RESISTOR
	R34	QRD161J-153	RESISTOR
⚠	R35	QRZ0077-220X	FUSIBLE RESISTOR
	R36	QRD161J-103	RESISTOR
	R37	QRD161J-222	RESISTOR
	R38	QRD181J-100	RESISTOR
	R40	QRD161J-393	RESISTOR
	R41	QRD161J-471	RESISTOR
	R48	QRD161J-331	RESISTOR
	R49	QRD161J-102	RESISTOR
⚠	R51	QRD162J-332	RESISTOR
	C30	QETC1CM-476	E CAPACITOR
	C32	QETC1CM-107	E CAPACITOR
	C33	QFN31HJ-103	M CAPACITOR
	C35	QETC1AM-107	E CAPACITOR
	C36	QFN31HJ-103	M CAPACITOR
	C38	QETB1EM-108	E CAPACITOR
	C40	QETC1CM-107	E CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C41	QETC1JM-476	E CAPACITOR
	C42	QETC1JM-476	E CAPACITOR
	C43	QETC1HM-226	E CAPACITOR
	C44	QETC1HM-226	E CAPACITOR
	C45	QETC1HM-226	E CAPACITOR
	C46	QETC1CM-107	E CAPACITOR
	C47	QETC1CM-106	E CAPACITOR
	C48	QEK61CM-106	E CAPACITOR
⚠	POC1	QMP14B0-200	POWER CORD
⚠	POC2 DR	QMP14B0-200E	POWER CORD
⚠	T2	PU60455	POWER TRANSFORMER
⚠	AO1	QMC0242-007	AC OUTLET
	BKT1	PQ20531-3	TRANS BRACKET
⚠	HD1	QHS3771-108	STRAIN RELIEF
	HS1	PQ43230	HEAT SINK(2)
	SCW1	DPSP3010Z	SCREW, X2, FOR H.SINK
	SCW2	SDST3006Z	SCREW, X3, FOR BOARD
	SCW3	DPSP4008Z	SCREW, X2, FOR TRANS
	SLD1	PQ32179	SHILD CASE(2)
	SLD2	PQ32180	SHILD CASE(3)
⚠	SLD3	PQ32075-2-2	COVER (1)
	CN3	PU60417-6	CAP HOUSING
	CN4	PU58844-2	CAP HOUSING
	CN5	PU58844-2	CAP HOUSING
	CN6	PU58844-3	CAP HOUSING
	CN7	PU58844-2	CAP HOUSING
	CN8	PU60417-8	CAP HOUSING
	CN9	PU58844-3	CAP HOUSING
	CN11	PU58844-2	CAP HOUSING
	CN12	PU58844-2	CAP HOUSING
	CN13	PU58844-2	CAP HOUSING
⚠	CP3	ICP-F20	CIRCUIT PROTECTOR

****

****
* 6. MAIN BOARD ASSEMBLY <03> *
****

PWBA	PB10057C-01	MAIN BOARD ASSY
HN1	PU58018-1-2	PWB HINGE, X2
RV1	PU52105	PLASTIC RIVET
SLD1	PQ43396	VIDEO SHIELD
SPC1	PQM30029-10	SPACER
SPC2	PQM30029-28	SPACER

-VIDEO SECTION-

IC1	PB20166D	Y MODULE
IC3	M51647SP	IC
IC4	MN3801	IC
IC5	MN3801	IC
IC6	MN3106	IC
IC10	BU4030B	IC
IC11	AN3211NK	IC
IC12	BA7021	IC
IC13	LA7220	IC
IC14	LA7220	IC
IC15	LA7220	IC
IC16	LA7220	IC
IC17	LA7220	IC
IC18	BU4013B	IC
IC301	PU22517C	C.MODULE
IC302	BA7233	IC

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	Q1	2SC1740S(QRS)	TRANSISTOR
	Q2	2SC1740S(S)	TRANSISTOR
	Q3	2SC1740S(QRS)	TRANSISTOR
	Q4	2SA933S(RS)	TRANSISTOR
	Q5	2SC1740S(QRS)	TRANSISTOR
	Q6	2SC1740S(S)	TRANSISTOR
	Q7	2SC1740S(S)	TRANSISTOR
	Q8	2SC1740S(S)	TRANSISTOR
	Q9	DTC144ES	TRANSISTOR
	Q10	DTC144ES	TRANSISTOR
	Q11	2SC1740S(QRS)	TRANSISTOR
	Q12	2SC1740S(QRS)	TRANSISTOR
	Q13	2SC1740S(QRS)	TRANSISTOR
	Q19	2SC1740S(QRS)	TRANSISTOR
	Q20	2SA933S(RS)	TRANSISTOR
	Q27	DTA124ES	TRANSISTOR
	Q30	2SC1740S(QRS)	TRANSISTOR
	Q33	2SA933S(RS)	TRANSISTOR
	Q35	DTC144ES	TRANSISTOR
	Q37	DTA124ES	TRANSISTOR
	Q39	DTA124ES	TRANSISTOR
	Q40	DTA124ES	TRANSISTOR
	Q42	2SC1740S(QRS)	TRANSISTOR
	Q43	2SA933S(RS)	TRANSISTOR
	Q45	2SA854S(R)	TRANSISTOR
	Q47	2SA854S(R)	TRANSISTOR
	Q48	DTA124ES	TRANSISTOR
	Q49	2SA854S(R)	TRANSISTOR
	Q52	2SA933S(RS)	TRANSISTOR
	Q53	2SA933S(RS)	TRANSISTOR
	Q54	DTC144ES	TRANSISTOR
	Q56	2SC1740S(S)	TRANSISTOR
	Q57	2SC1740S(QRS)	TRANSISTOR
	Q58	2SA933S(RS)	TRANSISTOR
	Q59	2SA933S(RS)	TRANSISTOR
	Q60	DTC144ES	TRANSISTOR
	Q64	2SA933S(RS)	TRANSISTOR
	Q69	2SA933S(RS)	TRANSISTOR
	Q70	DTC144ES	TRANSISTOR
	Q301	DTC144ES	TRANSISTOR
	Q303	2SC3354(TS)	TRANSISTOR
	Q305	2SC3354(TS)	TRANSISTOR
	Q306	2SC1740S(QRS)	TRANSISTOR
	Q308	2SC1740S(QRS)	TRANSISTOR
	Q309	2SC1740S(QRS)	TRANSISTOR
	Q311	2SC1740S(QRS)	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	0A90	DIODE
	D5	0A90	DIODE
	D19	1SS133	DIODE
	D20	1SS133	DIODE
	D21	1SS133	DIODE
	D27	1SS133	DIODE
	D28	1SS133	DIODE
	D29	1SS133	DIODE
	D32	1SS133	DIODE
	D36	1SS133	DIODE
	D37	1SS133	DIODE
	D38	1SS133	DIODE
	D40	1SS133	DIODE
	D41	1SS133	DIODE
	D43	1SS133	DIODE
	D45	1SS133	DIODE
	D46	1SS133	DIODE
	D47	1SS133	DIODE
	D48	1SS133	DIODE
	D49	1SS133	DIODE
	D50	1SS133	DIODE
	D54	1SS133	DIODE
	D55	1SS133	DIODE

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D64	1SS133	DIODE
	D66	1SS133	DIODE
	D67	1SS133	DIODE
	D68	1SS133	DIODE
	D70	1SS133	DIODE
	D71	1SS133	DIODE
	D72	1SS133	DIODE
	D73	1SS133	DIODE
	D76	1SS133	DIDDE
	D77	1SS133	DIODE
	D79	1SS133	DIODE
	D80	1SS133	DIODE
	D88	1SS133	DIODE
	D91	1SS133	DIODE
	D92	1SS133	DIODE
	D93	1SS133	DIODE
	D98	1SS133	DIODE
	D301	1SS133	DIODE
	D302	1SS133	DIODE
	D303	1SS133	DIODE
	R1	QRD161J-123	RESISTOR
	R2	QRD161J-123	RESISTOR
	R3	QVZ3518-103	V RESISTOR, CCD BIAS 1
	R4	QRD161J-123	RESISTOR
	R5	QRD161J-223	RESISTOR
	R6	QRD161J-103	RESISTOR
	R7	QRD161J-103	RESISTOR
	R8	QRD161J-333	RESISTOR
	R9	QRD161J-102	RESISTOR
	R10	QRD161J-102	RESISTOR
	R11	QRD161J-393	RESISTOR
	R12	QRD161J-561	RESISTOR
	R13	QRD161J-182	RESISTOR
	R14	QRD161J-102	RESISTOR
	R15	QRD161J-102	RESISTOR
	R16	QRD161J-472	RESISTOR
	R17	QRD161J-222	RESISTOR
	R18	QRD161J-562	RESISTOR
	R19	QRD161J-103	RESISTOR
	R20	QVZ3518-103	V RESISTOR, CCD BIAS 2
	R21	QRD161J-123	RESISTOR
	R22	QRD161J-225	RESISTOR
	R23	QRD161J-103	RESISTOR
	R24	QRD161J-103	RESISTOR
	R25	QRD161J-102	RESISTOR
	R26	QRD161J-222	RESISTOR
	R27	QRD161J-182	RESISTOR
	R28	QVZ3518-102	V RESISTOR, YNR NC BALANCE
	R29	QRD161J-223	RESISTOR
	R30	QRD161J-184	RESISTOR
	R31	QRD161J-271	RESISTOR
	R32	QRD161J-121	RESISTOR
	R33	QRD161J-471	RESISTOR
	R34	QRD161J-122	RESISTOR
	R35	QRD161J-471	RESISTOR
	R36	QRD161J-222	RESISTOR
	R37	QRD161J-472	RESISTOR
	R38	QRD161J-103	RESISTOR
	R39	QRD161J-682	RESISTOR
	R40	QVZ3518-471	V RESISTOR, COLOR COMB ADJ
	R41	QRD161J-391	RESISTOR
	R42	QRD161J-821	RESISTOR
	R43	QRD161J-152	RESISTOR
	R44	QRD161J-471	RESISTOR
	R45	QVZ3518-102	V RESISTOR, Y COMB ADJ
	R46	QRD161J-561	RESISTOR
	R47	QRD161J-561	RESISTOR
	R48	QVZ3518-221	V RESISTOR, Y COMB ADJ
	R49	QRD161J-102	RESISTOR
	R50	QRD161J-272	RESISTOR
	R52	QRD161J-273	RESISTOR
	R59	QRD161J-182	RESISTOR
	R60	QRD161J-473	RESISTOR
	R65	QRD161J-123	RESISTOR
	R66	QRD161J-822	RESISTOR
	R67	QRD161J-104	RESISTOR
	R68	QRD161J-103	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R80	QRD161J-103	RESISTOR
	R83	QRD161J-102	RESISTOR
	R84	QRD161J-102	RESISTOR
	R86	QRD161J-561	RESISTOR
	R87	QRD161J-102	RESISTOR
	R107	QRD161J-102	RESISTOR
	R108	QRD161J-821	RESISTOR
	R109	QVZ3518-102	V RESISTOR, REC FM LEV(N-MODE)
	R110	QRD161J-103	RESISTOR
	R111	QRD161J-223	RESISTOR
	R113	QRD161J-391	RESISTOR
	R115	QRD161J-391	RESISTOR
	R121	QRD161J-102	RESISTOR
	R131	QVZ3518-333	V RESISTOR, PB Y LEV(N-MODE)
	R132	QRD181J-103	RESISTOR
	R133	QRD161J-222	RESISTOR
	R134	QRD161J-102	RESISTOR
	R135	QRD161J-391	RESISTOR
	R137	QRD161J-681	RESISTOR
	R138	QRD161J-392	RESISTOR
	R139	QRD161J-104	RESISTOR
	R140	QRD161J-103	RESISTOR
	R141	QRD161J-562	RESISTOR
	R142	QRD161J-103	RESISTOR
	R143	QRD161J-152	RESISTOR
	R145	QRD161J-104	RESISTOR
	R146	QRD161J-104	RESISTOR
	R147	QRD161J-103	RESISTOR
	R149	QRD161J-272	RESISTOR
	R150	QRD161J-393	RESISTOR
	R151	QRD161J-393	RESISTOR
	R152	QRD161J-272	RESISTOR
	R153	QRD161J-273	RESISTOR
	R155	QRD161J-222	RESISTOR
	R156	QRD161J-472	RESISTOR
	R158	QRD123J-391	RESISTOR
	R161	QRD161J-750	RESISTOR
	R164	QRD161J-102	RESISTOR
	R165	QRD161J-102	RESISTOR
	R166	QRD161J-102	RESISTOR
	R167	QRD161J-393	RESISTOR
	R168	QRD161J-472	RESISTOR
	R169	QRD161J-103	RESISTOR
	R170	QRD161J-102	RESISTOR
	R171	QRD161J-102	RESISTOR
	R172	QRD161J-102	RESISTOR
	R173	QRD161J-102	RESISTOR
	R174	QRD161J-473	RESISTOR
	R175	QRD161J-472	RESISTOR
	R177	QRD161J-473	RESISTOR
	R178	QRD161J-473	RESISTOR
	R180	QRD161J-103	RESISTOR
	R182	QRD161J-471	RESISTOR
	R183	QRD161J-331	RESISTOR
	R184	QRD161J-222	RESISTOR
	R185	QRD161J-393	RESISTOR
	R186	QRD161J-103	RESISTOR
	R190	QRD161J-472	RESISTOR
	R193	QRD161J-473	RESISTOR
	R194	QRD161J-393	RESISTOR
	R195	QRD161J-102	RESISTOR
	R196	QRD161J-102	RESISTOR
	R197	QRD161J-102	RESISTOR
	R198	QRD161J-332	RESISTOR
	R199	QRD161J-152	RESISTOR
	R200	QRD161J-152	RESISTOR
	R201	QRD161J-152	RESISTOR
	R202	QRD161J-153	RESISTOR
	R203	QRD161J-393	RESISTOR
	R204	QVZ3518-103	V RESISTOR, E-E LEVEL
	R205	QRD161J-332	RESISTOR
	R206	QRD161J-393	RESISTOR
	R207	QRD161J-101	RESISTOR
	R214	QRD161J-272	RESISTOR
	R215	QRD161J-272	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R216	QRD161J-105	RESISTOR
	R217	QRD161J-272	RESISTOR
	R220	QRD161J-475	RESISTOR
	R222	QRD161J-152	RESISTOR
	R223	QRD161J-272	RESISTOR
	R224	QRD161J-152	RESISTOR
	R225	QRD161J-102	RESISTOR
	R226	QRD161J-333	RESISTOR
	R227	QRD161J-562	RESISTOR
	R228	QRD161J-182	RESISTOR
	R229	QRD161J-152	RESISTOR
	R230	QRD161J-125	RESISTOR
	R231	QRD161J-102	RESISTOR
	R233	QRD161J-222	RESISTOR
	R237	QRD161J-273	RESISTOR
	R238	QRD161J-101	RESISTOR
	R241	QRD162J-684	RESISTOR
	R244	QRD161J-104	RESISTOR
	R245	QRD161J-822	RESISTOR
	R247	QRD161J-273	RESISTOR
	R248	PU52108-2R2	POSISTOR
	OR	PU52108-2R2T	POSISTOR
	R249	QRD162J-431	RESISTOR
	R250	QRD162J-431	RESISTOR
	R301	QRD161J-102	RESISTOR
	R302	QRD161J-332	RESISTOR
	R303	QRD161J-152	RESISTOR
	R304	QRD161J-103	RESISTOR
	R305	QRD161J-222	RESISTOR
	R306	QRD161J-102	RESISTOR
	R308	QRD161J-102	RESISTOR
	R309	QRD161J-102	RESISTOR
	R310	QRD161J-102	RESISTOR
	R311	QRD161J-182	RESISTOR
	R312	QRD161J-102	RESISTOR
	R313	QVZ3518-471	V RESISTOR, SP COLOR LEVEL
	R314	QVZ3518-471	V RESISTOR, EP COLOR LEVEL
	R315	QRD161J-103	RESISTOR
	R316	QRD161J-682	RESISTOR
	R317	QRD161J-123	RESISTOR
	R318	QRD161J-332	RESISTOR
	R319	QRD161J-273	RESISTOR
	R320	QRD161J-102	RESISTOR
	R321	QVZ3518-471	V RESISTOR, CNR FB
	R322	QRD161J-101	RESISTOR
	R323	QVZ3518-472	V RESISTOR, CNR BAL
	R324	QRD161J-561	RESISTOR
	R325	QRD161J-561	RESISTOR
	R326	QRD161J-223	RESISTOR
	R328	QVZ3518-222	V RESISTOR, CNR INPUT LEVEL
	R334	QRD161J-222	RESISTOR
	R335	QRD161J-152	RESISTOR
	R338	QRD161J-102	RESISTOR
	R339	QRD161J-472	RESISTOR
	C2	QEK60JM-476	E CAPACITOR
	C3	QCVB1CN-103	CAPACITOR
	C4	QCSB1HJ-100	CAPACITOR
	C5	QCSB1HJ-100	CAPACITOR
	C6	QCVB1CN-103	CAPACITOR
	C7	QEK61HM-105	E CAPACITOR
	C8	QCVB1CN-103	CAPACITOR
	C9	QCVB1CN-103	CAPACITOR
	C10	QCVB1CN-103	CAPACITOR
	C11	QCVB1CN-103	CAPACITOR
	C12	QEK61EM-475	E CAPACITOR
	C13	QCSB1HJ-220	CAPACITOR
	C14	QCVB1CN-103	CAPACITOR
	C16	QCC31CJ-472	CAPACITOR
	C17	QEK61HM-225	E CAPACITOR
	C18	QCVB1CN-103	CAPACITOR
	C20	QEK60JM-476	E CAPACITOR
	C21	QCVB1CN-103	CAPACITOR
	C22	QEK61EM-475	E CAPACITOR
	C25	QEK60JM-476	E CAPACITOR
	C26	QCVB1CN-103	CAPACITOR
	C27	QCVB1CN-103	CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C28	QCSB1HJ-100	CAPACITOR
	C29	QEK61HM-105	E CAPACITOR
	C30	QCVB1CN-103	CAPACITOR
	C31	QCVB1CN-103	CAPACITOR
	C32	QCVB1CN-103	CAPACITOR
	C33	QCVB1CN-103	CAPACITOR
	C34	QETC1CM-106	E CAPACITOR
	C35	QEK61CM-476	E CAPACITOR
	C36	QEK61HM-105	E CAPACITOR
	C37	QEK60JM-476	E CAPACITOR
	C38	QCVB1CN-103	CAPACITOR
	C39	QCSB1HJ-200	CAPACITOR
	C40	QCSB1HJ-470	CAPACITOR
	C41	QCSB1HJ-560	CAPACITOR
	C42	QCVB1CN-103	CAPACITOR
	C43	QCSB1HJ-470	CAPACITOR
	C44	QETC1CM-227	E CAPACITOR
	C45	QCVB1CN-103	CAPACITOR
	C46	QCVB1CN-103	CAPACITOR
	C47	QETC1CM-476	E CAPACITOR
	C48	QCVB1CN-103	CAPACITOR
	C49	QETC1CM-106	E CAPACITOR
	C50	QCVB1CN-103	CAPACITOR
	C51	QCVB1CN-103	CAPACITOR
	C64	QCVB1CN-103	CAPACITOR
	C81	QCBB1HJ-151	CAPACITOR
	C82	QCBB1HJ-181	CAPACITOR
	C83	QCVB1CN-103	CAPACITOR
	C90	QCVB1CN-103	CAPACITOR
	C92	QETA0JM-476	E CAPACITOR
	C96	QCVB1CN-103	CAPACITOR
	C97	QCSB1HJ-560	CAPACITOR
	C98	QCVB1CN-103	CAPACITOR
	C99	QCSB1HJ-220	CAPACITOR
	C100	QETC1AM-226	E CAPACITOR
	C101	QETC1HM-105	E CAPACITOR
	C102	QETC1HM-225	E CAPACITOR
	C103	QETC1HM-105	E CAPACITOR
	C106	QCVB1CN-103	CAPACITOR
	C107	QCVB1CN-103	CAPACITOR
	C108	QCVB1CN-103	CAPACITOR
	C109	QEK51EM-475	E CAPACITOR
	C110	QETC1HM-474	E CAPACITOR
	C111	QETC1EM-335	E CAPACITOR
	C112	QCVB1CN-103	CAPACITOR
	C113	QETC0JM-107	E CAPACITOR
	C116	QCVB1CN-103	CAPACITOR
	C119	QETC1CM-106	E CAPACITOR
	C120	QETA0JM-477	E CAPACITOR
	C123	QCVB1CN-103	CAPACITOR
	C124	QETC1CM-476	E CAPACITOR
	C128	QETC1AM-226	E CAPACITOR
	C129	QETA0JM-336	E CAPACITOR
	C130	QCVB1CN-103	CAPACITOR
	C131	QETC1EM-475	E CAPACITOR
	C132	QETC1CM-106	E CAPACITOR
	C134	QETC1CM-106	E CAPACITOR
	C136	QEN61EM-475	NP E CAPACITOR
	C137	QCVB1CN-103	CAPACITOR
	C138	QCVB1CN-103	CAPACITOR
	C139	QCVB1CN-103	CAPACITOR
	C140	QCVB1CN-103	CAPACITOR
	C141	QCVB1CN-103	CAPACITOR
	C142	QETC0JM-476	E CAPACITOR
	C143	QCVB1CN-103	CAPACITOR
	C144	QCVB1CN-103	CAPACITOR
	C145	QCVB1CN-103	CAPACITOR
	C146	QCSB1HJ-560	CAPACITOR
	C147	QCVB1CN-103	CAPACITOR
	C149	QCVB1CN-103	CAPACITOR
	C151	QCVB1CN-103	CAPACITOR
	C152	QETC1CM-106	E CAPACITOR
	C153	QETC1CM-336	E CAPACITOR
	C156	QETC1CM-106	E CAPACITOR
	C157	QETC1CM-336	E CAPACITOR
	C158	QETC1HM-225	E CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C160	QETC1CM-106	E CAPACITOR
	C161	QCVB1CN-103	CAPACITOR
	C162	QCSB1HJ-560	CAPACITOR
	C163	QCVB1CN-103	CAPACITOR
	C164	QCVB1CN-103	CAPACITOR
	C165	QCVB1CN-103	CAPACITOR
	C166	QCVB1CN-103	CAPACITOR
	C167	QETC1CM-476	E CAPACITOR
	C168	QETC1CM-106	E CAPACITOR
	C169	QETC1CM-106	E CAPACITOR
	C170	QETC1CM-106	E CAPACITOR
	C171	QETC1CM-106	E CAPACITOR
	C172	QCVB1CN-103	CAPACITOR
	C173	QETC1HM-224	E CAPACITOR
	C174	QCVB1CN-103	CAPACITOR
	C175	QETC0JM-107	E CAPACITOR
	C176	QETC1HM-225	E CAPACITOR
	C177	QETA1EM-475	E CAPACITOR
	C178	QETC1EM-335	E CAPACITOR
	C179	QETC1AM-226	E CAPACITOR
	C180	QCXB1CM-222	CAPACITOR
	C181	QEK40JM-476	E CAPACITOR
	C182	QCVB1CN-103	CAPACITOR
	C183	QEN41HM-105	NP E CAPACITOR
	C185	QETC1HM-105	E CAPACITOR
	C186	QCVB1CN-103	CAPACITOR
	C189	QETC0JM-107	E CAPACITOR
	C190	QEN61HM-105	NP E CAPACITOR
	C194	QCVB1CN-103	CAPACITOR
	C195	QFN41HJ-223	M CAPACITOR
	C196	QCVB1CN-103	CAPACITOR
	C197	QCBB1HJ-102	CAPACITOR
	C198	QCSB1HJ-470	CAPACITOR
	C199	QCS31HJ-330	CAPACITOR
	C201	QCSB1HJ-270	CAPACITOR
	C202	QCVB1CN-103	CAPACITOR
	C203	QCVB1CN-103	CAPACITOR
	C204	QCBB1HJ-221	CAPACITOR
	C206	QCBB1HJ-101	CAPACITOR
	C207	QCBB1HJ-820	CAPACITOR
	C208	QETC1AM-226	E CAPACITOR
	C209	QCBB1HJ-102	CAPACITOR
	C210	QCBB1HJ-102	CAPACITOR
	C211	QCBB1HJ-102	CAPACITOR
	C212	QCBB1HJ-102	CAPACITOR
	C213	QCBB1HJ-102	CAPACITOR
	C215	QCVB1CN-103	CAPACITOR
	C216	QCVB1CN-103	CAPACITOR
	C217	QCSB1HJ-470	CAPACITOR
	C218	QCSB1HJ-180	CAPACITOR
	C219	QCSC1HJ-330	CAPACITOR
	C223	QCBB1HJ-102	CAPACITOR
	C224	QCSB1HJ-100	CAPACITOR
	C225	QCBB1HJ-151	CAPACITOR
	C226	QCVB1CN-103	CAPACITOR
	C227	QCVB1CN-103	CAPACITOR
	C228	QCT05CH-221	CAPACITOR
	C301	QETC0JM-337	E CAPACITOR
	C302	QETC1EM-475	E CAPACITOR
	C303	QETC1HM-224	E CAPACITOR
	C304	QEN61HM-474	NP E CAPACITOR
	C305	QETC1HM-104	E CAPACITOR
	C307	QCVB1CN-103	CAPACITOR
	C308	QCBB1HJ-820	CAPACITOR
	C309	QETC0JM-337	E CAPACITOR
	C310	QETA1EM-335	E CAPACITOR
	C312	QCVB1CN-103	CAPACITOR
	C313	QETC1HM-474	E CAPACITOR
	C314	QCVB1CN-103	CAPACITOR
	C315	QCVB1CN-103	CAPACITOR
	C316	QCSB1HJ-560	CAPACITOR
	C317	QCSB1HJ-300	CAPACITOR
	C318	QCC31CJ-473	CAPACITOR
	C319	QCVB1CN-103	CAPACITOR
	C320	QCVB1CN-103	CAPACITOR
	C321	QCVB1CN-103	CAPACITOR
	C322	QCT25CH-101	CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C323	QCVB1CN-103	CAPACITOR
	C324	QCVB1CN-103	CAPACITOR
	C325	QCVB1CN-103	CAPACITDR
	C326	QCVB1CN-103	CAPACITOR
	C327	QETC1HM-105	E CAPACITOR
	C330	QETC0JM-476	E CAPACITOR
	C331	QETC0JM-476	E CAPACITOR
	C332	QCVB1CN-103	CAPACITOR
	C333	QCVB1CN-103	CAPACITOR
	C337	QCBB1HJ-331	CAPACITOR
	C338	QCVB1CN-103	CAPACITOR
	C339	QER61CM-106	E CAPACITOR
	C341	QFN31HJ-562	M CAPACITOR
	C342	QCVB1CN-103	CAPACITOR
	C343	QCS31HJ-6R0	CAPACITOR
	C344	QCSB1HJ-150	CAPACITOR
	L1	PU48530-101K	PEAKING COIL, 100 MICRO
	L2	PU48530-1R2K	PEAKING COIL, 1.2 MICRO
	L3	PU48530-101K	PEAKING COIL, 100 MICRO
	L5	PU59152-101J	PEAKING COIL, 100 MICRO
	L6	PU59152-270J	PEAKING COIL, 27 MICRO
	L7	PU48530-101K	PEAKING COIL, 100 MICRO
	L12	PU59152-560J	PEAKING COIL, 56 MICRO
	L13	PU48530-391J	PEAKING COIL, 390 MICRO
	L15	PU48530-101K	PEAKING COIL, 100 MICRO
	L18	PU59152-181J	PEAKING COIL, 180 MICRO
	L19	PU59152-820J	PEAKING COIL, 82 MICRO
	L20	PU59152-680J	PEAKING COIL, 68 MICRO
	L21	PU48530-101K	PEAKING COIL, 100 MICRO
	L22	PU48530-101K	PEAKING COIL, 100 MICRO
	L23	PU48530-101K	PEAKING COIL, 100 MICRO
	L26	PU48530-101K	PEAKING COIL, 100 MICRO
	L27	PU48530-101K	PEAKING COIL, 100 MICRO
	L28	PU48530-151K	PEAKING COIL, 150 MICRO
	L29	PU48530-101K	PEAKING COIL, 100 MICRO
	L32	PU48530-1R0K	PEAKING COIL, 1 MICRO
	L33	PU59152-330J	PEAKING COIL, 33 MICRO
	L34	PU53223-1R0H	PEAKING COIL, 1 MICRO
	L35	PU59152-1R2K	PEAKING COIL, 1.2 MICRO
	L301	PU60165-120G	PEAKING COIL, 12 MICRO
	L302	PU59153-101K	INDUCTOR, 100 MICRO
	L303	PU48530-471J	PEAKING COIL, 470 MICRO
	L304	PU48530-222J	PEAKING COIL, 2.2M
	L305	PU59152-150J	PEAKING COIL, 15 MICRO
	L306	PU48530-101K	PEAKING COIL, 100 MICRO
	L309	PU48530-101K	PEAKING COIL, 100 MICRO
	L311	PU48530-102J	PEAKING COIL, 1M
	L312	PU59152-181J	PEAKING COIL, 180 MICRO
	L313	PU59152-181J	PEAKING COIL, 180 MICRO
	EQ1	PU60429	EQUALIZER
	EQ3	PU60099	EQUALIZER
	EQ302	PU60432	EQUALIZER
	LPF1	PU60054-2	LOW PASS FILTER
	LPF3	PU60427	LOW PASS FILTER
	LPF4	PU60179	LOW PASS FILTER
	LPF5	PU60443	LOW PASS FILTER
	LPF301	PU60430-2	LOW PASS FILTER
	BPF3	PU57399-2	BAND PASS FILTER
	BPF301	PU60431	BAND PASS FILTER
	DL301	PU60227	1H DELAY LINE
	DL302	PU58294	DELAY LINE
⚠	X301	PU60059	CRYSTAL RESONATOR
⚠	OR	PU60323	CRYSTAL RESONATOR
	T301	PU60057	T FILTER
	T302	PU58295	COIL
	SLD1	PU36446	SHIELD CASE
	SLD2	PU60425	SHIELD COVER
	SLD3	PU60426	SHIELD PLATE
	TP	PU57545	TEST PIN, x19

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	CN1	PU58844-8	CAP HOUSING
	CN2	PU58844-4	CAP HOUSING
	CN3	PU58844-3	CAP HOUSING
	CN4	PU58844-14	CAP HOUSING
	CN5	PU58844-10	CAP HOUSING
	CN6	PU60417-8	CAP HOUSING
	CN7	PU58844-3	CAP HOUSING
	CN8	PU60417-5	CAP HOUSING
	CN9	PU59555-2	CAP HOUSING
	CN10	PU58844-2	CAP HOUSING
	CN11	PU58844-2	CAP HOUSING
	CN12	PU58844-6	CAP HOUSING
	CN14	PU58844-3	CAP HOUSING
	CN15	PU58844-3	CAP HOUSING
	CP1	ICP-F10	CIRCUIT PROTECT
		-SERVO SECTION-	
	IC421	HD49712ANT	IC
	IC461	BU2767S	IC
	Q402	DTA124ES	TRANSISTOR
	OR	2SA1346	TRANSISTOR
	OR	UN4112	TRANSISTOR
	Q403	DTA124ES	TRANSISTOR
	OR	UN4112	TRANSISTOR
	OR	2SA1346	TRANSISTOR
	Q404	DTA124ES	TRANSISTOR
	OR	2SA1346	TRANSISTOR
	OR	UN4112	TRANSISTOR
	Q405	DTA124ES	TRANSISTOR
	OR	2SA1346	TRANSISTOR
	OR	UN4112	TRANSISTOR
	Q406	DTC124ES	TRANSISTOR
	OR	UN4212	TRANSISTOR
	OR	2SC3400	TRANSISTOR
	Q408	2SA1309Q,R,S	TRANSISTOR
	Q422	2SC3311A	TRANSISTOR
	Q423	DTA124ES	TRANSISTOR
	OR	2SA1346	TRANSISTOR
	OR	UN4112	TRANSISTOR
	Q461	DTA124ES	TRANSISTOR
	OR	2SA1346	TRANSISTOR
	OR	UN4112	TRANSISTOR
	Q463	2SD1468S(SE)	TRANSISTOR
	Q464	2SD1468S(SE)	TRANSISTOR
	Q465	DTC124ES	TRANSISTOR
	OR	UN4212	TRANSISTOR
	OR	2SC3400	TRANSISTOR
	D401	HSS101-01	DIODE
	OR	1SS101	DIODE
	D405	1SS133	DIODE
	OR	MA165	DIODE
	D406	1SS133	DIODE
	OR	MA165	DIODE
	D407	1SS133	DIODE
	OR	MA165	DIODE
	D408	1SS133	DIODE
	OR	MA165	DIODE
	D409	1SS133	DIODE
	OR	MA165	DIODE
	D421	1SS133	DIODE
	OR	MA165	DIODE
	D422	1SS133	DIODE
	OR	MA165	DIODE
	D423	1SS133	DIODE
	OR	MA165	DIODE
	D424	1SS133	DIODE
	OR	MA165	DIODE
	D425	1SS133	DIODE
	OR	MA165	DIODE
	D426	1SS133	DIODE
	OR	MA165	DIODE
	D461	11E2	DIODE
	D465	1SS133	DIODE
	OR	MA165	DIODE
	D467	1SS133	DIODE
	OR	MA165	DIODE
	D468	1SS133	DIODE
	OR	MA165	DIODE

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D470	1SS133	DIODE
	R401	QRD161J-102	RESISTOR
	R403	QRD161J-823	RESISTOR
	R406	QRD161J-472	RESISTOR
	R407	QRD161J-393	RESISTOR
	R408	QVZ3518-474	V RESISTOR, TK PRESET (EP)
	R409	QRD161J-274	RESISTOR
	R410	QVZ3518-474	V RESISTOR, TK PRESET (SP)
	R414	QRD161J-335	RESISTOR
	R415	QRD161J-823	RESISTOR
	R416	QRD161J-331	RESISTOR
	R417	QRD161J-223	RESISTOR
	R421	QRD161J-102	RESISTOR
	R422	QRD161J-155	RESISTOR
	R425	QRD161J-105	RESISTOR
	R426	QRD161J-562	RESISTOR
	R427	QRD161J-332	RESISTOR
	R428	QRD161J-222	RESISTOR
	R429	QRD161J-563	RESISTOR
	R430	QRD161J-105	RESISTOR
	R431	QRD161J-123	RESISTOR
	R432	QRD161J-223	RESISTOR
	R433	QRD161J-392	RESISTOR
	R434	QRD161J-473	RESISTOR
	R435	QRD161J-105	RESISTOR
	R436	QRD161J-105	RESISTOR
	R437	QRD161J-105	RESISTOR
	R438	QRD161J-393	RESISTOR
	R439	QRD161J-223	RESISTOR
	R440	QRD161J-105	RESISTOR
	R441	QRD161J-823	RESISTOR
	R443	QRD161J-102	RESISTOR
	R444	QRD161J-124	RESISTOR
	R445	QVZ3518-474	V RESISTOR, PB SW POINT
	R446	QRD161J-103	RESISTOR
	R447	QRD161J-222	RESISTOR
	R448	QRD161J-221	RESISTOR
	R449	QRD161J-223	RESISTOR
	R450	QRD161J-472	RESISTOR
	R451	QRD161J-103	RESISTOR
	R452	QRD161J-102	RESISTOR
	R453	QRD161J-103	RESISTOR
	R454	QRD161J-561	RESISTOR
	R455	QRD161J-223	RESISTOR
	R456	QRD161J-682	RESISTOR
	R457	QRD161J-102	RESISTOR
	R458	QRD161J-474	RESISTOR
	R459	QRD161J-103	RESISTOR
	R460	QRD161J-102	RESISTOR
	R461	QRD161J-103	RESISTOR
	R466	QRD161J-684	RESISTOR
	R467	QRD161J-224	RESISTOR
	R468	QRD161J-104	RESISTOR
	R469	QRD162J-563	RESISTOR
	R470	QRD161J-154	RESISTOR
	R471	QRD161J-184	RESISTOR
	R472	QVZ3518-105	V RESISTOR, SLOW TK PRESET(SP)
	R473	QRD161J-394	RESISTOR
	R474	QRD161J-124	RESISTOR
	R475	QRD161J-103	RESISTOR
	R485	QRD161J-123	RESISTOR
	R486	QRD161J-822	RESISTOR
	R487	QRD161J-222	RESISTOR
	R488	QRD161J-473	RESISTOR
	R489	QRG019J-331S	OMF.RESISTOR
	R490	QRD161J-562	RESISTOR
	R491	QRD161J-473	RESISTOR
	R492	QRD161J-105	RESISTOR
	C401	QFV71HJ-124	M CAPACITOR
	C403	QCF31HP-102	CAPACITOR
	C421	QCC31CK-102	CAPACITOR
	C422	QEK61AM-226	E CAPACITOR
	C423	QEK61AM-226	E CAPACITOR
	C424	QCSB1HJ-150	CAPACITOR
	C426	QCXB1CN-272	CAPACITOR
	C427	QEK61HM-105	E CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C428	QCC31CK-223	CAPACITOR
	C429	QCS31HJ-331	CAPACITOR
	C430	QCC31CK-102	CAPACITOR
	C431	QCC31CK-104	CAPACITOR
	C432	QEK61AM-226	E CAPACITOR
	C433	QCC31CK-102	CAPACITOR
	C434	QCC31CK-682	CAPACITOR
	C435	QFV71HJ-334	M CAPACITOR
	C436	QETC1EM-475	E CAPACITOR
	C437	QETC1EM-475	E CAPACITOR
	C438	QETC1EM-106	E CAPACITOR
	C439	QETC1EM-106	E CAPACITOR
	C440	QEN61HM-225	NP E CAPACITOR
	C441	QCC31CK-104	CAPACITOR
	C442	QCS31HJ-101	CAPACITOR
	C443	QFN31HJ-682	M CAPACITOR
	C444	QEK61HM-105	E CAPACITOR
	C445	QEK61AM-226	E CAPACITOR
	C446	QCBB1HJ-101	CAPACITOR
	C447	QCC31CK-102	CAPACITOR
	C448	QCC31CK-103	CAPACITOR
	C449	QCC31CK-473	CAPACITOR
	C451	QCSB1HJ-680	CAPACITOR
	C461	QEK61AM-226	E CAPACITOR
	C462	QFV71HJ-393	M CAPACITOR
	C463	QFV71HJ-104	M CAPACITOR
	C464	QFV71HJ-104	M CAPACITOR
	C465	QFV71HJ-124	M CAPACITOR
	C466	QFV71HJ-393	M CAPACITOR
	C467	QCBB1HJ-681	CAPACITOR
	C468	QCBB1HJ-471	CAPACITOR
	C471	QCC11CK-102	CAPACITOR
⚠	CF461	PU60215	RESONATOR
	TP	PU57545	TEST PIN, X4
	CN401	PU58844-5	CAP HOUSING
	CN402	PU58844-3	CAP HOUSING
	CN403	PU58844-2Y	CAP HOUSING
	CN405	PU58844-4	CAP HOUSING
	CN409	PU58844-2	CAP HOUSING
		-SERVO SUB BOARD ASSY-	
	PWBA	PB40037A	SERVO SUB BOARD ASSY
	Q1	DTC124ES	TRANSISTOR
	Q2	DTA124ES	TRANSISTOR
	Q3	DTC124TS	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	1SS133	DIODE
	R1	QRD161J-272	RESISTOR
	R2	QRD161J-472	RESISTOR
	R3	QRD161J-104	RESISTOR

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* 7. MECHANISM CONTROL BOARD ASSY <04> *
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	PWBA	PB20123C-01	MECHANISM CTL BOARD ASSY
	IC1	M50938-610SP	IC
	IC2	BA6259N	IC
	IC3	M54647L	IC
	IC4	BA6222	IC
	IC5	M50255P	IC
	Q1	2SC1740S(RS)	TRANSISTOR
	Q7	DTC124ES	TRANSISTOR
	Q8	2SK656	FE TRANSISTOR
	D1	HZS4.3EB2	ZENER DIODE

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D2	MA165	DIODE
	OR	1SS133	DIODE
	D3	MA165	DIODE
	OR	1SS133	DIODE
	D4	MA165	DIODE
	OR	1SS133	DIODE
	D5	HZS7.5EB2	ZENER DIODE
	D6	MA165	DIODE
	OR	1SS133	DIODE
	DA1	DAP209S	DIODE
	R1	QRD161J-152	RESISTOR
	R2	QRD161J-332	RESISTOR
	R3	QRD161J-122	RESISTOR
	R4	QRD161J-823	RESISTOR
	R5	QRD161J-102	RESISTOR
	R6	QRD161J-102	RESISTOR
	R7	QRD161J-102	RESISTOR
	R8	QRD161J-103	RESISTOR
	R9	QRD161J-472	RESISTOR
	R10	QRD161J-105	RESISTOR
	R11	QRD161J-472	RESISTOR
	R12	QRD161J-472	RESISTOR
	R13	QRD161J-472	RESISTOR
	R14	QRD161J-472	RESISTOR
	R15	QRD161J-472	RESISTOR
	R16	QRD161J-472	RESISTOR
	R17	QRD161J-472	RESISTOR
	R18	QRD161J-472	RESISTOR
	R19	QRD161J-472	RESISTOR
	R20	QRD161J-472	RESISTOR
	R21	QRD161J-472	RESISTOR
	R22	QRD161J-472	RESISTOR
	R23	QRD161J-472	RESISTOR
	R24	QRD161J-472	RESISTOR
	R25	QRD161J-472	RESISTOR
	R26	QRD161J-124	RESISTOR
	R27	QRD161J-124	RESISTOR
	R28	QRD161J-333	RESISTOR
	R29	QRD161J-331	RESISTOR
	R30	QRD161J-822	RESISTOR
	R31	QRD161J-103	RESISTOR
	R32	QRD161J-821	RESISTOR
	R34	QRD161J-472	RESISTOR
	R35	QRD161J-472	RESISTOR
	R36	QRD161J-333	RESISTOR
	R37	QRD161J-333	RESISTOR
	R38	QRD161J-331	RESISTOR
	R40	QRD161J-103	RESISTOR
	R41	QRD161J-103	RESISTOR
	R42	QRD161J-103	RESISTOR
	R43	QRD161J-472	RESISTOR
	R44	QRD161J-223	RESISTOR
	R45	QRD161J-331	RESISTOR
	RA1	QRB037J-103	RESISTOR ARRAY
	RA2	QRB049J-472	RESISTOR ARRAY
	RA3	QRB049J-103	RESISTOR ARRAY
	C1	QCFB1EZ-223	CAPACITOR
	C2	QETC1EM-335	E CAPACITOR
	C3	QCFB1EZ-223	CAPACITOR
	C4	QETC1HM-105	E CAPACITOR
	C5	QETC1EM-106	E CAPACITOR
	C6	QETC1EM-106	E CAPACITOR
	C8	QETC1EM-475	E CAPACITOR
	C10	QCC11EJ-104	CAPACITOR
	C11	QCC11EJ-103	CAPACITOR
	C12	QEK41HM-105	E CAPACITOR
	CF1	PU60414	CERAMIC FILTER
⚠	HS1	PU60158	HEAT SINK
	SCW1	SBSE3006Z	TAPPING SCREW, X2
	SCW2	SBSE3008Z	TAPPING SCREW
	WR1	PW30112-LOAF6AG	PARALLEL WIRE
	CN1	PU59934-17	WIRE HOLDER
	CN2	PU58844-6	CAP HOUSING
	CN3	PU58844-6	CAP HOUSING

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	CN4	PU60417-11	CAP HOUSING
	CN5	PU60417-8	CAP HOUSING
	CN6	PU58844-3	CAP HOUSING
	CN7	PU60417-9	CAP HOUSING
	CN8	PU58844-2	CAP HOUSING
	CN10	PU60417-8	CAP HOUSING
	CN11	PU58844-3	CAP HOUSING
	CN12	PU58844-3	CAP HOUSING
	CN14	PU58844-2	CAP HOUSING
	CN16	PU60417-8	CAP HOUSING
	CN17	PU58844-2	CAP HOUSING
	CN18	PU58844-3	CAP HOUSING
	CP1	ICP-F20	CIRCUIT PROTECT
			**********
			* 8. TERMINAL BOARD ASSEMBLY <06> *
			**********
	PWBA	PB20179C-02	TERMINAL BOARD ASSY
⚠	RF1	PU60399	RF CONVERTER/SWITCH
	R3	QRD162J-750	RESISTOR
	R5	QRD161J-182	RESISTOR
	R6	QRD161J-182	RESISTOR
	CL1	PU59311-2	WIRE CLAMP
	SCW1	SDSF3008Z	TAPPING SCREW, X2
	SPC1	PQM30029-113	SPACER
	TML1	PU60280-3	TERM.B.ASS'Y
	WR1	PW30401-AB22T	COAXIAL CORD
			**********
			* 9. IF BOARD ASSEMBLY <07> *
			**********
	PWBA	PB10004F-02	IF BOARD ASSY
	IC1	M51365SP	IC
	Q1	2SC3354	TRANSISTOR
	Q3	2SC3243D,E	TRANSISTOR
	OR	2SC2655	TRANSISTOR
	Q4	2SC536SPA(FG)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR
	Q5	2SC536SPA(G)	TRANSISTOR
	OR	2SC3311A(S)	TRANSISTOR
	Q6	2SA1309S	TRANSISTOR
	Q7	2SC536SPA(G)	TRANSISTOR
	OR	2SC3311A(S)	TRANSISTOR
	Q10	2SC3354	TRANSISTOR
	D1	MTZ10D	ZENER DIODE
	D6	1SS133	DIODE
	D7	1SS133	DIODE
	D8	1SS133	DIODE
	R3	NRD718J-331NBU	C RESISTOR
	R4	NRD718J-472NBU	C RESISTOR
	R5	NRD718J-220NBU	C RESISTOR
	R6	NRD718J-102NBU	C RESISTOR
	R7	NRD718J-391NBU	C RESISTOR
	R8	NRD718J-101NBU	C RESISTOR
	R9	NRD718J-680NBU	C RESISTOR
	R17	NRD718J-562NBU	C RESISTOR
	R18	NRD718J-332NBU	C RESISTOR
	R19	NRD718J-222NBU	RESISTOR
	R20	NRD718J-222NBU	C RESISTOR
	R21	QVZ3518-472	V RESISTOR,RF AGC
	R22	NRD718J-824NBU	C RESISTOR
	R23	NRD718J-102NBU	C RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R24	NRD718J-102NBU	C RESISTOR
	R25	NRD718J-821NBU	RESISTOR
	R26	NRD718J-104NBU	C RESISTOR
	R27	NRD718J-104NBU	C RESISTOR
	R28	NRD718J-104NBU	C RESISTOR
	R31	NRD718J-222NBU	C RESISTOR
	R33	NRD718J-223NBU	RESISTOR
	R34	NRD718J-470NBU	C RESISTOR
	R35	NRD718J-561NBU	C RESISTOR
	R36	NRD718J-561NBU	C RESISTOR
	R37	NRD718J-271NBU	C RESISTOR
	R38	NRD718J-152NBU	RESISTOR
	R39	NRD718J-152NBU	C RESISTOR
	R40	QVZ3518-682	V RESISTOR,COLOR LEVEL
	R41	NRD718J-471NBU	C RESISTOR
	R45	NRD718J-471NBU	C RESISTOR
	R46	NRD718J-104NBU	C RESISTOR
	R47	NRD718J-103NBU	C RESISTOR
	R48	NRD718J-562NBU	C RESISTOR
	R49	NRD718J-103NBU	C RESISTOR
	R50	NRD718J-471NBU	C RESISTOR
	R51	NRD718J-223NBU	C RESISTOR
	R52	NRD718J-223NBU	C RESISTOR
	R53	NRD718J-103NBU	C RESISTOR
	R54	NRD718J-562NBU	C RESISTOR
	R57	NRD718J-123NBU	RESISTOR
	R60	NRD718J-680NBU	RESISTOR
	R61	NRD718J-331NBU	RESISTOR
	R62	NRD718J-472NBU	RESISTOR
	R63	NRD718J-101NBU	RESISTOR
	R64	NRD718J-561NBU	RESISTOR
	R65	NRD718J-151NBU	RESISTOR
	R66	NRD718J-470NYU	RESISTOR
	R71	QRD161J-271	RESISTOR
	C5	NCB71HK-102NBR	CAPACITOR
	C6	NCB71HK-102NBR	CAPACITOR
	C7	NCB71HK-102NBR	CAPACITOR
	C8	NCB71HK-102NBR	CAPACITOR
	C10	QETC1CM-336	E CAPACITOR
	C11	NCY71CM-103NBR	CAPACITOR
	C13	NCY71CM-103NBR	CAPACITOR
	C14	PU57601-474ME	E CAPACITOR, 0.47/50V
	C15	QETC1CM-336	E CAPACITOR
	C16	NCF71EZ-223N	CAPACITOR
	C17	NCF71EZ-223N	CAPACITOR
	C18	QFV71HJ-104	M CAPACITOR
	C19	NCB71HK-102NBR	CAPACITOR
	C20	NCY71CM-103NBR	CAPACITOR
	C21	NCB71HK-101NBR	CAPACITOR
	C22	QETC1HM-105	E CAPACITOR
	C24	QETC1HM-105	E CAPACITOR
	C25	NCB71HK-102NBR	CAPACITOR
	C26	QFN31HJ-123	M CAPACITOR
	C27	QETC1HM-474	E CAPACITOR
	C28	NCT71HJ-100NBR	CAPACITOR
	C29	NGT71HJ-100NBR	CAPACITOR
	C30	NCY71CM-103NBR	CAPACITOR
	C31	QETC1CM-106	E CAPACITOR
	C32	NCF71EZ-223NBR	CAPACITOR
	C33	QETC1HM-474	E CAPACITOR
	C39	NCB71HK-102NYR	CAPACITOR
	C41	NCB71HK-102NBR	CAPACITOR
	C42	QCT25HH-470	CAPACITOR
	C43	NCB71HK-102NBR	CAPACITOR
	C44	NCT71HM-1R0NBR	CAPACITOR
	C45	QCT25CH-121	CAPACITOR
	C46	NCT71HK-5R6NBR	CAPACITOR
	C50	QETC1CM-336	E CAPACITOR
	L2	PU60025-R68	PEAKING COIL, 0.68 MICRO
	L3	PU60025-1R0	PEAKING COIL, 1 MICRO
	L4	PU54223-180J	PEAKING COIL, 18 MICRO
	L5	PU54223-820J	PEAKING COIL, 82 MICRO
	L6	PU54223-470K	PEAKING COIL, 47 MICRO
	CF1	PU58558	CERAMIC FILTER
	CF3	PU59039	CERAMIC FILTER

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	SAW1	PU35557	SAW FILTER
⚠	T2	PU60027-01-01	I.F.T. ,VCO
	T3	PU60028	IF.TRANSFORMER, AFC
	T4	PU60104	IF.TRANSFORMER, FM DET
	T5	PU55184	IF.TRANSFORMER, S.DET
	T6	PU60263	COIL, SIF
	T7	PU60258-2	COIL, SIF
	T8	PU60107	COIL, TRAP
	HD1	PQ32168	HOLDER
	TML1	PU59935-16	TERMINAL

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* 10. TUNER CTL BOARD ASSEMBLY <08> *
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	PWBA	PB10003P	TUNER CTL BOARD ASSY
⚠	TNR1	PU36419	TUNER
	IC1	TD6358P	IC
	Q1	2SC3311A(S)	TRANSISTOR
	OR	2SC1740S(S)	TRANSISTOR
	Q3	2SC1317(S)	TRANSISTOR
	Q5	UN4319VI	TRANSISTOR
	Q6	UN4319VI	TRANSISTOR
	Q7	UN4319VI	TRANSISTOR
	Q8	UN4319VI	TRANSISTOR
	Q13	2SC3399	TRANSISTOR
	OR	DTC144ES	TRANSISTOR
	D1	HZ30-2	ZENER DIODE
	D2	E-452-2	DIODE
	D4	1SS136	DIODE
	D5	1SS133	DIODE
	R1	NRD718J-333NBU	RESISTOR
	R2	NRD718J-153NBU	RESISTOR
	R3	NRD718J-121NBU	RESISTOR
	R7	NRD718J-221NBU	RESISTOR
	R14	NRD718J-102NBU	RESISTOR
	R15	NRD718J-102NBU	RESISTOR
	R16	NRD718J-102NBU	RESISTOR
	R19	NRD718J-102NBU	RESISTDR
	R22	NRD718J-184NBU	RESISTOR
	R51	NRD718J-103NBU	RESISTOR
	R52	NRD718J-103NBU	RESISTOR
	R55	QRD161J-750	RESISTOR
	C1	QFN31HK-223	M CAPACITOR
	C2	QFV71HJ-474	M CAPACITOR
	OR	QFZ9011-474	MM CAPACITOR
	C3	QETC1HM-106	E CAPACITOR
	C4	QETC1CM-106	E CAPACITOR
	C5	QETC1CM-336	E CAPACITOR
	C7	NCS71HJ-270NBR	CAPACITOR
	C8	NCS71HJ-270NBR	CAPACITOR
	C9	NCY71CM-103NBR	CAPACITOR
	C10	NCY71CM-103NBR	CAPACITOR
	C11	NCY71CM-103NBR	CAPACITOR
	C13	NCY71CM-103NBR	CAPACITOR
	C14	NCY71CM-103NBR	CAPACITOR
	C15	QEK61AM-336	E CAPACITOR
	C16	NCY71CM-103NBR	CAPACITOR
	C30	QETC1HM-225	E CAPACITOR
	C40	QCF11HP-103	CAPACITOR
	C43	QCBB1HJ-102	CAPACITOR
⚠	X1	PU60029	CRYSTAL RESONATOR
	SLD1	PU36374-01-01	SHIELD CASE
	SLD2	PU36375	SHILD COVER
	SLO3	PU36376	SHILD PLATE
	WR1	PW30401-AF09T	COAXIAL CORD ASSY
	CN1	PU58844-2	CAP HOUSING
	CN2	PU58844-4	CAP HOUSING
	CN3	PU60417-6	CAP HOUSING
	CN5	PU58844-3	CAP HOUSING

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* 11. AUDIO BOARD ASSEMBLY <09> *
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	PWBA	PB20174B	AUDIO BOARD ASSY
⚠	IC1	AN3380NK	IC
	IC2	TA7361AP	IC
	IC3	PB20167B	FMA MODULE
	IC101	UPC78N05	IC
	Q2	2SC3311(RS)	TRANSISTOR
	Q3	DTC144WS	TRANSISTOR
	Q4	2SC1740S(RS)	TRANSISTOR
	Q5	DTC114ES	TRANSISTOR
	Q6	DTC114ES	TRANSISTOR
	Q7	DTC114ES	TRANSISTOR
	Q8	DTA114ES	TRANSISTOR
	Q9	DTA124ES	TRANSISTOR
	Q10	2SC1740S(RS)	TRANSISTOR
	Q11	DTC143TS	TRANSISTOR
	Q12	DTC143TS	TRANSISTOR
	Q13	DTC143TS	TRANSISTOR
	Q16	DTA144ES	TRANSISTOR
	Q17	DTA114ES	TRANSISTOR
	Q18	2SC3311(RS)	TRANSISTOR
	Q25	2SC1740S(RS)	TRANSISTOR
	Q26	DTC143TS	TRANSISTOR
	Q27	DTA144ES	TRANSISTOR
	Q28	2SC1740S(RS)	TRANSISTOR
	Q101	2SD1468S(RS)	TRANSISTOR
	Q102	2SA854S(QR)	TRANSISTOR
	Q103	2SB1068(KU)	TRANSISTOR
	D1	1SS133	DIODE
	OR	MA165	DIODE
	D2	1SS133	DIODE
	OR	MA165	DIODE
	D4	1SS133	DIODE
	OR	MA165	DIODE
	D5	1SS133	DIODE
	OR	MA165	DIODE
	D6	1SS133	DIODE
	OR	MA165	DIODE
	D7	1SS133	DIODE
	OR	MA165	DIODE
	D8	1SS133	DIODE
	OR	MA165	DIODE
	D9	HZ2BLL	ZENER DIODE
	D10	1SS133	DIODE
	OR	MA165	DIODE
	D12	1SS133	DIODE
	OR	MA165	DIODE
	D16	HZ5A2	ZENER DIODE
	D17	1SS133	DIODE
	OR	MA165	DIODE
	D18	1SS133	DIODE
	OR	MA165	DIODE
	D20	1SS133	DIODE
	OR	MA165	DIODE
	D22	1SS133	DIODE
	OR	MA165	DIODE
	D23	1SS133	DIODE
	OR	MA165	DIODE
	D24	1SS133	DIODE
	OR	MA165	DIODE

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D25	1SS133	DIODE
	OR	MA165	DIODE
	D26	1SS133	DIODE
	OR	MA165	DIODE
	D27	1SS133	DIODE
	OR	MA165	DIODE
	D30	1SS133	DIODE
	D31	1SS133	DIODE
	OR	MA165	DIODE
	D32	1SS133	DIODE
	OR	MA165	DIODE
	D33	DAN209S	DIODE
	D34	HZ6A2	ZENER DIODE
	D35	1SS133	DIODE
	OR	MA165	DIODE
	D102	1SS133	DIODE
	OR	MA165	DIODE
	R1	QRD161J-123	RESISTOR
	R2	QRD161J-153	RESISTOR
	R3	QRD161J-102	RESISTOR
	R4	QRD161J-682	RESISTOR
	R6	QRD161J-152	RESISTOR
	R7	QRD161J-222	RESISTOR
	R8	QRD161J-100	RESISTOR
	R9	QVZ3518-473	V RESISTOR, BIAS LEVEL
	R10	QRD161J-103	RESISTOR
	R11	QRD161J-104	RESISTOR
	R12	QRD161J-102	RESISTOR
	R13	QRD161J-473	RESISTOR
	R14	QRD161J-6R8	RESISTOR
	R15	QRD161J-103	RESISTOR
	R16	QRD161J-562	RESISTOR
	R17	QRD161J-472	RESISTOR
	R20	QRD161J-223	RESISTOR
	R21	QRD161J-151	RESISTOR
	R22	QRD161J-151	RESISTOR
	R23	QRD161J-273	RESISTOR
	R24	QRD161J-153	RESISTOR
	R25	QRD161J-103	RESISTOR
	R26	QRD161J-224	RESISTOR
	R27	QRD161J-391	RESISTOR
	R28	QVZ3518-102	V RESISTOR, PB LEVEL
	R29	QRD161J-102	RESISTOR
	R30	QVZ3518-152	V RESISTOR, LEVEL INDICATOR(L)
	R31	QRD161J-151	RESISTOR
	R32	QRD161J-102	RESISTOR
	R33	QRD161J-102	RESISTOR
	R34	QRD161J-151	RESISTOR
	R35	QVZ3518-152	V RESISTOR, LEVEL INDICATOR(R)
	R37	QRD161J-0R0	RESISTOR
	R39	QRD161J-0R0	RESISTOR
	R40	QVZ3518-152	V RESISTOR, E-E LEVEL (L)
	R41	QVZ3518-152	V RESISTOR, E-E LEVEL (R)
	R42	QRD161J-223	RESISTOR
	R43	QRD161J-101	RESISTOR
	R44	QRD161J-101	RESISTOR
	R45	QRD161J-392	RESISTOR
	R46	QRD161J-332	RESISTOR
	R47	QRD161J-153	RESISTOR
	R48	QRD161J-223	RESISTOR
	R49	QRD161J-274	RESISTOR
	R50	QRD161J-222	RESISTOR
	R51	QRD161J-222	RESISTOR
	R52	QRD161J-103	RESISTOR
	R53	QRD161J-333	RESISTOR
	R54	QRD161J-183	RESISTOR
	R55	QRD161J-472	RESISTOR
	R56	QRD161J-152	RESISTOR
	R57	QRD161J-271	RESISTOR
	R58	QRD161J-333	RESISTOR
	R60	QRD161J-333	RESISTOR
	R63	QRD161J-102	RESISTOR
	R64	QRD161J-331	RESISTOR
	R65	QRD161J-393	RESISTOR
	R66	QRD161J-8R2	RESISTOR
	R67	QRD161J-103	RESISTOR
	R68	QRD161J-103	RESISTOR
	R70	QRD162J-273	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R72	QRD161J-392	RESISTOR
	R81	QRD161J-103	RESISTOR
	R82	QRD162J-153	RESISTOR
	R83	QRD161J-222	RESISTOR
	R84	QRD161J-222	RESISTOR
	R85	QRD161J-472	RESISTOR
	R88	QRD161J-333	RESISTOR
	R89	QRD161J-224	RESISTOR
	R90	QRD162J-562	RESISTOR
	R91	QRD182J-151	RESISTOR
	R100	QRD161J-333	RESISTOR
	R101	QRD161J-102	RESISTOR
	R103	QRD161J-562	RESISTOR
	R104	QRD161J-102	RESISTOR
	R105	QRD161J-103	RESISTOR
	R106	QRD161J-681	RESISTOR
	C1	QEK61CM-106	E CAPACITOR
	C2	QETC1AM-476	E CAPACITOR
	C3	QEP61CM-106	PP CAPACITOR
	C4	QETC1CM-106	E CAPACITOR
	C5	QETC1CM-226	E CAPACITOR
	C6	QETC1AM-336	E CAPACITOR
	C7	QETC1AM-476	E CAPACITOR
	C8	QCBB1HK-102	CAPACITOR
	C9	QCBB1HK-101	CAPACITOR
	C10	QETC1AM-336	E CAPACITOR
	C11	QETC1AM-107	E CAPACITOR
	C12	QETC1CM-226	E CAPACITOR
	C13	QETC1CM-106	E CAPACITOR
	C14	QEP61CM-106	PP CAPACITOR
	C15	QETC1AM-476	E CAPACITOR
	C16	QETC1CM-106	E CAPACITOR
	C17	QCBB1HJ-331	CAPACITOR
	C18	QFV71HJ-223	M CAPACITOR
	C19	QCC11EJ-102	CAPACITOR
	C20	QCC11EJ-102	CAPACITOR
	C21	QEK61CM-106	E CAPACITOR
	C22	QETC1HM-225	E CAPACITOR
	C24	QCBB1HK-102	CAPACITOR
	C25	QEK61HM-225	E CAPACITOR
	C26	QETC1AM-336	E CAPACITOR
	C27	QETC0JM-107	E CAPACITOR
	C28	QFV71HJ-823	M CAPACITOR
	C29	QFN31HJ-273	M CAPACITOR
	C30	QETC1CM-106	E CAPACITOR
	C31	QETC1CM-106	E CAPACITOR
	C32	QFN31HJ-103	M CAPACITOR
	C33	QFV71HJ-224	M CAPACITOR
	C34	QEB51CM-106	LL CAP
	C35	QEB51HM-105	E CAPACITOR
	C36	QETC1CM-106	E CAPACITOR
	C37	QETC1AM-336	E CAPACITOR
	C38	QETC1CM-476	E CAPACITOR
	C39	QETC1AM-336	E CAPACITOR
	C40	QETC1CM-106	E CAPACITOR
	C41	QETC1CM-476	E CAPACITOR
	C42	QETC1HM-225	E CAPACITOR
	C43	QETC1CM-106	E CAPACITOR
	C44	QETC1HM-225	E CAPACITOR
	C45	QEN61HM-225	NP E CAPACITOR
	C46	QEN41HM-225	NP E CAPACITOR
	C47	QETC1HM-225	E CAPACITOR
	C48	QETC1HM-104	E CAPACITOR
	C49	QCF31HP-223	CAPACITOR
	C50	QFV71HJ-104	M CAPACITOR
	C51	QFV71HJ-104	M CAPACITOR
	C52	QFV71HJ-104	M CAPACITOR
	C53	QCF31HP-223	CAPACITOR
	C54	QETC1AM-107	E CAPACITOR
	C55	QCVB1CN-103	CAPACITOR
	C56	QCBB1HJ-331	CAPACITOR
	C57	QCSC1HJ-330	CAPACITOR
	C58	QCBB1HJ-331	CAPACITOR
	C59	QCBB1HJ-102	CAPACITOR
	C60	QCVB1CN-103	CAPACITOR
	C61	QCBB1HJ-102	CAPACITOR
	C62	QCVB1CN-103	CAPACITOR
	C63	QCC11EJ-272	CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C66	QETC1HM-106	E CAPACITOR
	C67	QETC1CM-106	E CAPACITOR
	C68	QETC1HM-105	E CAPACITOR
	C69	QETC1HM-105	E CAPACITOR
	C70	QCSB1HJ-680	CAPACITOR
	C71	QCSB1HJ-680	CAPACITOR
	C72	QCBB1HK-561	CAPACITOR
	C73	QCBB1HK-561	CAPACITOR
	C74	QCC11EJ-102	CAPACITOR
	C75	QCC11EJ-102	CAPACITOR
	C76	QFV81HJ-333	M CAPACITOR
	C77	QEK61CM-106	E CAPACITOR
	C78	QFV71HJ-104	M CAPACITOR
	C79	QCC11EJ-273	CAPACITOR
	C101	QETC1EM-476	E CAPACITOR
	C103	QETC1HM-105	E CAPACITOR
	C104	QETC1CM-106	E CAPACITOR
	L1	PU53223-101J	PEAKING COIL, 100 MICRO
	L3	PU58308-472J	PEAKING COIL, 4.7M
	L4	PU54223-221J	PEAKING COIL, 220 MICRO
	L5	PU54223-101J	PEAKING COIL, 100 MICRO
	BPF1	PU60200	BAND PASS FILTER
	BPF2	PU60200-2	BAND PASS FILTER
⚠	T1	PU60303	OSC TRANS
⚠	T2	PU60304	OSC TRANS
	HN1	PU58018-1-2	PWB HINGE,X2
	HS2	PU60261	HEAT SINK,FOR IC101
	RV1	PU52105	PLASTIC RIVET
	SLD1	PU59960	P/R AMP SHIELD1
	SLD2	PU59961	P/R AMP SHIELD2
	SLD3	PU59962	P/R AMP SHIELD3
	SLD4	PQ43345	SHIELD PLATE
	TP	PU55774	TEST PIN,X8
	CN1	PU58844-3	CAP HOUSING
	CN2	PU60417-8	CAP HOUSING
	CN3	PU58844-5	CAP HOUSING
	CN4	PU58844-2	CAP HOUSING
	CN5	PU58844-5	CAP HOUSING
	CN6	PU58844-4	CAP HOUSING
	CN7	PU58844-7	CAP HOUSING
	CN8	PU60417-5	CAP HOUSING
	CN9	PU58844-4	CAP HOUSING
	CN10	PU60417-11	CAP HOUSING
	CN12	PU58844-3	CAP HOUSING

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* 12. AUDIO/CONTROL HEAD BOARD <12> *
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	PWB1	PU57643-1-2	AUDIO/CTL HEAD BOARD
	BKT1	PQ43014	BRACKET
	SCW1	SPSH1740	MINI SCREW
	CN1	PU54537-5	CAP HOUSING
	CN2	PU54537-2	CAP HOUSING

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* 13. DEMODULATOR BOARD ASSEMBLY <14> *
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	PWBA	PB20129A	DEMODULATOR BOARD ASSY
	IC1	CX20112	IC
	IC2	CXA1011P	IC
	IC3	CXA1011P	IC
	IC4	M5239L	IC

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	Q1	2SD1468S(SE)	TRANSISTOR
	Q2	2SD1468S(SE)	TRANSISTOR
	Q3	2SD1468S(SE)	TRANSISTOR
	Q4	DTA114ES	TRANSISTOR
	Q5	DTA144WS	TRANSISTOR
	Q7	2SD1450S,T	TRANSISTOR
	Q8	2SC1740S(RS)	TRANSISTOR
	Q9	2SC1740S(RS)	TRANSISTOR
	Q10	2SC1740S(RS)	TRANSISTOR
	D1	MTZ10D	ZENER DIODE
	D2	MTZ6.8B	ZENER DIODE
	D3	1SS133	DIODE
	D4	1SS133	DIODE
	D5	1SS133	DIODE
	D8	1SS133	DIODE
	D9	1SS133	DIODE
	D12	1SS133	DIODE
	D13	1SS133	DIODE
	D15	1SS133	DIODE
	D16	1SS133	DIODE
	R1	QRD161J-822	RESISTOR
	R2	QRV144F-1203AY	C.M.F RESISTOR
	R3	QVZ3531-333	V RESISTOR,STERED FILTER ADJ
	R4	QRV144F-1203AY	C.M.F RESISTOR
	R5	QVZ3531-333	V RESISTOR,2ND AUD FIL ADJ
	R6	QRD161J-154	RESISTOR
	R11	QRD161J-103	RESISTOR
	R13	QRD162J-471	RESISTOR
	R14	QRD162J-471	RESISTOR
	R15	QRD161J-103	RESISTOR
	R16	QRD161J-102	RESISTOR
	R17	QRD161J-102	RESISTOR
	R18	QVZ3518-472	V RESISTOR,2ND AUD LEVEL
	R19	QVZ3518-103	V RESISTOR,SEPARATION
	R20	QRD161J-362	RESISTOR
	R21	QRD161J-224	RESISTOR
	R22	QVZ3518-104	V RESISTOR,OUTPUT LEVEL(L+R)
	R23	QVZ3531-332	V RESISTOR,STEREO VCO
	R24	QRD161J-332	RESISTOR
	R25	QRD161J-561	RESISTOR
	R26	QVZ3518-103	V RESISTOR,LEVEL (L-R)
	R27	QRV144F-5603AY	C.M.F RESISTDR
	R28	QRV144F-2322AY	C.M.F RESISTOR
	R29	QRD161J-222	RESISTOR
	R30	QRD161J-182	RESISTOR
	R31	QRD161J-473	RESISTOR
	R32	QRD161J-361	RESISTOR
	R33	QRD161J-301	RESISTOR
	R34	QRD161J-682	RESISTOR
	R35	QRD161J-752	RESISTOR
	R36	QVZ3518-682	V RESISTOR,SPECTRUM
	R37	QRV144F-5603AY	C.M.F RESISTOR
	R38	QRV144F-2322AY	C.M.F RESISTOR
	R39	QRD161J-272	RESISTOR
	R40	QRD161J-561	RESISTOR
	R41	QRD161J-153	RESISTOR
	R42	QRD161J-361	RESISTOR
	R43	QRD161J-682	RESISTOR
	R44	QRD161J-752	RESISTOR
	R45	QRD161J-272	RESISTOR
	R46	QRD161J-102	RESISTOR
	R47	QRD161J-102	RESISTOR
	R48	QRD161J-332	RESISTOR
	R49	QRD161J-332	RESISTOR
	R50	QRD161J-332	RESISTOR
	R53	QRD182J-271	RESISTOR
	R54	QRD161J-301	RESISTOR
	R55	QVZ3518-472	V RESISTOR,2ND AUD LEVEL
	R56	QRD161J-683	RESISTOR
	R57	QRD161J-183	RESISTOR
	R58	QRD161J-221	RESISTOR
	R59	QRD161J-104	RESISTOR
	R60	QRD161J-104	RESISTOR
	R61	QRD161J-153	RESISTOR
	R62	QRD161J-472	RESISTOR
	R63	QRD161J-125	RESISTOR
	R64	QRD161J-472	RESISTOR
	R65	QRD162J-392	RESISTOR
	R67	QRD161J-473	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R70	QRD161J-103	RESISTOR
	R73	QRD161J-103	RESISTOR
	R74	QRD161J-103	RESISTOR
	R76	QRV144F-1002AY	C.M.F RESISTOR
	R78	QRD161J-822	RESISTOR
	R79	QRD161J-102	RESISTOR
	C1	QEK61CM-106	E CAPACITOR
	C2	QCC11EK-473	CAPACITOR
	C3	QEK61CM-106	E CAPACITOR
	C4	QCC11EK-223	CAPACITOR
	C5	QEK61HM-105	E CAPACITOR
	C6	QEK61HM-105	E CAPACITOR
	C8	QFL31HJ-472	M CAPACITOR
	C10	QEK61CM-106	E CAPACITOR
	C11	QEK61CM-106	E CAPACITOR
	C12	QFV71HJ-223	M CAPACITOR
	C13	QEK61CM-106	E CAPACITOR
	C14	PU58285-182J	PP CAP, 1800P +5,-5% /50V
	C15	QEK61HM-105	E CAPACITOR
	C16	QEK61EM-475	E CAPACITOR
	C17	QEK61CM-106	E CAPACITOR
	C18	QEK61CM-106	E CAPACITOR
	C19	QEK61CM-106	E CAPACITOR
	C20	QEE81CJ-335	TA.CAP
	C21	QEK61HM-105	E CAPACITOR
	C22	QEE81CJ-106	TA.CAP
	C23	QEK61HM-225	E CAPACITOR
	C24	QEK61CM-106	E CAPACITOR
	C25	QETC1CM-107	E CAPACITOR
	C26	QFL31HJ-472	M CAPACITOR
	C27	QEK61HM-105	E CAPACITOR
	C28	QEN61CM-106	NP E CAPACITOR
	C29	QFV71HJ-223	M CAPACITOR
	C30	QFV71HJ-104	M CAPACITOR
	C31	QEK61HM-105	E CAPACITOR
	C32	QEK61CM-106	E CAPACITOR
	C33	QEE81CJ-335	TA.CAP
	C34	QEK61HM-105	E CAPACITOR
	C35	QEE81CJ-106	TA.CAP
	C36	QEK61HM-225	E CAPACITOR
	C37	QEK61CM-106	E CAPACITOR
	C38	QETC1CM-107	E CAPACITOR
	C39	QFL31HJ-152	M CAPACITOR
	C41	QEN61CM-106	NP E CAPACITOR
	C42	QFV71HJ-223	M CAPACITOR
	C43	QFV71HJ-104	M CAPACITOR
	C44	QEK61HM-105	E CAPACITOR
	C45	QEK61CM-106	E CAPACITOR
	C46	QCS81HJ-220	CAPACITOR
	C47	QETC1CM-107	E CAPACITOR
	C48	QCV81CN-103	CAPACITOR
	C49	QCBB1HJ-221	CAPACITOR
	C50	QEK61HM-105	E CAPACITOR
	C51	QFL31HJ-102	M CAPACITOR
	C52	QCBB1HJ-331	CAPACITOR
	C58	QFV71HJ-123	M CAPACITOR
	C59	QFV71HJ-123	M CAPACITOR
	L1	PU60036-821K	COIL, 820 MICRO
	L2	PU60211	L.P.FILTER
	L3	PU60211	L.P.FILTER
	CN1	PU58844-6	CAP HOUSING
	CN2	PU58844-3	CAP HOUSING
	CN3	PU58844-3	CAP HOUSING
	CN4	PU58844-2	CAP HOUSING

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* 14. DIGITAL BOARD ASSEMBLY <15> *
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	PWBA	PB10099A-03	DIGITAL BOARD ASSY
	IC1	M51271FP	IC
	IC2	NJM2217L	IC
	IC3	M51272FP	IC
	IC4	M51279FP	IC
	IC5	NJM2217L	IC
	IC6	M50747-621FP	IC
	OR	M50747E-898FP	IC
	IC7	M65011FP-C	IC
	IC8	M52678FP	IC
	IC9	M52678FP	IC
	IC10	M5M4C500L-10	IC
	IC11	M5M4C500L-10	IC
	IC12	M5M4C500L-10	IC
	IC13	M52679FP	IC
	IC14	M52679FP	IC
	IC15	M52679FP	IC
	IC16	UPD74HC00G	IC
	IC17	TD62003F	IC
	IC18	TD62003F	IC
	IC19	UPC393C	IC
	IC20	TC74HC4053AF	IC
	IC21	TC74HC4053AF	IC
	IC22	TC74HC02F	IC
	IC23	TC74HC02F	IC
	Q1	2SC2412K(RS)	TRANSISTOR
	Q2	2SA1037K(RS)	TRANSISTOR
	Q3	2SA1037K(RS)	TRANSISTOR
	Q4	2SA1037K(RS)	TRANSISTOR
	Q5	2SA1037K(RS)	TRANSISTOR
	Q6	2SC2412K(RS)	TRANSISTOR
	Q7	2SA1037K(RS)	TRANSISTOR
	Q8	2SC2412K(RS)	TRANSISTOR
	Q9	2SC2412K(RS)	TRANSISTOR
	Q10	DTC144EK	TRANSISTOR
	Q11	2SC2412K(RS)	TRANSISTOR
	Q12	2SA1037K(RS)	TRANSISTOR
	Q13	2SC1740(RS)	TRANSISTOR
	Q14	2SC1740(RS)	TRANSISTOR
	D1	DAN202K	DIODE
	D2	DAP202K	DIODE
	D3	MA151WK	DIODE
	D4	MA151WK	DIODE
	D5	DAN202K	DIODE
	R1	QRSA08J-153YN	RESISTOR
	R2	QRSA08J-123YN	RESISTOR
	R3	QRSA08J-222YN	RESISTOR
	R4	QRSA08J-182YN	RESISTOR
	R5	QRSA08J-102YN	RESISTOR
	R6	QRSA08J-562YN	RESISTOR
	R7	QRSA08J-123YN	RESISTOR
	R8	QRSA08J-473YN	RESISTOR
	R9	QRSA08J-823YN	RESISTOR
	R10	QRSA08J-222YN	RESISTOR
	R11	QRSA08J-102YN	RESISTOR
	R12	QRSA08J-102YN	RESISTOR
	R13	QRSA08J-102YN	RESISTOR
	R14	QRSA08J-102YN	RESISTOR
	R15	QRSA08J-562YN	RESISTOR
	R16	QRSA08J-562YN	RESISTOR
	R17	QRSA08J-183YN	RESISTOR
	R18	QRSA08J-333YN	RESISTOR
	R19	QRSA08J-153YN	RESISTOR
	R20	QVZ3513-473	V RESISTOR,COLOR LEVEL
	R21	QRSA08J-474YN	RESISTOR
	R22	QRSA08J-152YN	RESISTOR
	R23	QVZ3513-473	V RESISTOR,COLOR PHASE
	R24	QRSA08J-151YN	RESISTOR
	R25	QRSA08J-331YN	RESISTOR
	R26	QRSA08J-823YN	RESISTOR
	R27	QRSA08J-222YN	RESISTOR
	R28	QRSA08J-103YN	RESISTOR
	R29	QRSA08J-223YN	RESISTOR
	R30	QVZ3513-103	V RESISTOR,AFC
	R31	QRSA08J-222YN	RESISTOR
	R32	QRSA08J-105YN	RESISTOR
	R35	QRSA08J-471YN	RESISTOR
	R36	QVZ3513-103	V RESISTOR,COL DIFFERENCE BAL
	R37	QVZ3513-473	V RESISTOR,CARR BALANCE(1)
	R39	QRSA08J-822YN	RESISTOR
	R40	QRSA08J-333YN	RESISTOR
	R42	QRSA08J-102YN	RESISTOR
	R43	QRSA08J-362YN	RESISTOR
	R44	QRSA08J-123YN	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R45	QRSA08J-472YN	RESISTOR
	R46	QRSA08J-471YN	RESISTOR
	R47	QRSA08J-272YN	RESISTOR
	R48	QVZ3513-473	V RESISTOR,BURST LEVEL
	R49	QVZ3513-473	V RESISTOR,CARR BARANCE(2)
	R50	QRSA08J-681YN	RESISTOR
	R51	QRSA08J-102YN	RESISTOR
	R52	QRSA08J-823YN	RESISTOR
	R53	QRSA08J-222YN	RESISTOR
	R54	QRSA08J-183YN	RESISTOR
	R55	QRSA08J-333YN	RESISTOR
	R56	QRSA08J-153YN	RESISTOR
	R57	QRSA08J-474YN	RESISTOR
	R58	QRSA08J-152YN	RESISTOR
	R59	QVZ3513-473	V RESISTOR,P IN P COLOR PHASE
	R60	QRSA08J-151YN	RESISTOR
	R61	QRSA08J-331YN	RESISTOR
	R62	QRSA08J-104YN	RESISTOR
	R63	QRSA08J-103YN	RESISTOR
	R64	QRSA08J-222YN	RESISTOR
	R65	QRSA08J-223YN	RESISTOR
	R66	QVZ3513-103	V RESISTOR,AFC
	R67	QRSA08J-222YN	RESISTOR
	R68	QRSA08J-105YN	RESISTOR
	R69	QRSA08J-103YN	RESISTOR
	R70	QRSA08J-103YN	RESISTOR
	R71	QRSA08J-102YN	RESISTOR
	R72	QRSA08J-331YN	RESISTOR
	R73	QVZ3513-102	V RESISTOR,COLOR
	R74	QRSA08J-105YN	RESISTOR
	R75	QRSA08J-103YN	RESISTOR
	R76	QRSA08J-105YN	RESISTOR
	R77	QRSA08J-102YN	RESISTOR
	R78	QRSA08J-183YN	RESISTOR
	R79	QRSA08J-472YN	RESISTOR
	R80	QRSA08J-822YN	RESISTOR
	R81	QRSA08J-392YN	RESISTOR
	R82	QRSA08J-562YN	RESISTOR
	R83	QRSA08J-103YN	RESISTOR
	R84	QRSA08J-333YN	RESISTOR
	R85	QRSA08J-113YN	RESISTOR
	R86	QRSA08J-472YN	RESISTOR
	R87	QRSA08J-104YN	RESISTOR
	R88	QRSA08J-184YN	RESISTOR
	R89	QRSA08J-472YN	RESISTOR
	R90	QRSA08J-472YN	RESISTOR
	R91	QRSA08J-562YN	RESISTOR
	R92	QRSA08J-122YN	RESISTOR
	R93	QRSA08J-152YN	RESISTOR
	R94	QRSA08J-331YN	RESISTOR
	R95	QRSA08J-332YN	RESISTOR
	R96	QRSA08J-122YN	RESISTOR
	R97	QRSA08J-471YN	RESISTOR
	R98	QRSA08J-152YN	RESISTOR
	R99	QRSA08J-105YN	RESISTOR
	R100	QRSA08J-105YN	RESISTOR
	R101	QRSA08J-561YN	RESISTOR
	R102	QRSA08J-561YN	RESISTOR
	R103	QRSA08J-331YN	RESISTOR
	R104	QRSA08J-102YN	RESISTOR
	R105	QRSA08J-222YN	RESISTOR
	R106	QRSA08J-822YN	RESISTOR
	R109	QRSA08J-103YN	RESISTOR
	R110	QRSA08J-332YN	RESISTOR
	R111	QRSA08J-103YN	RESISTOR
	R112	QRSA08J-105YN	RESISTOR
	R113	QRSA08J-105YN	RESISTOR
	R114	QRSA08J-751YN	RESISTOR
	R115	QRSA08J-471YN	RESISTOR
	R117	QRSA08J-471YN	RESISTOR
	R122	QRSA08J-562YN	RESISTOR
	R123	QRSA08J-222YN	RESISTOR
	R124	QRSA08J-222YN	RESISTOR
	R125	QRSA08J-102YN	RESISTOR
	R126	QRSA08J-223YN	RESISTOR
	R127	QRSA08J-103YN	RESISTOR
	R128	QRSA08J-153YN	RESISTOR
	R129	QRSA08J-684YN	RESISTOR
	R130	QRSA08J-684YN	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R131	QRD161J-105	RESISTOR
	R132	QRD161J-222	RESISTOR
	R133	QRD161J-182	RESISTOR
	R134	QRD161J-102	RESISTOR
	R135	QRD161J-222	RESISTOR
	R136	QRD161J-182	RESISTOR
	R137	QRD161J-102	RESISTOR
	C1	QEK61HM-105	E CAPACITOR
	C2	QEF81CM-474	TANTAL CAPACITOR
	C3	QEK61HM-105	E CAPACITOR
	C4	QCFA1HZ-473	CAPACITOR
	C5	QEK61HM-474	E CAPACITOR
	C6	QCYA1HK-102	CAPACITOR
	C7	QCYA1HK-103	CAPACITOR
	C8	QEK61AM-336	E CAPACITOR
	C9	QCYA1HK-102	CAPACITOR
	C10	QCYA1HK-103	CAPACITDR
	C11	QCYA1HK-103	CAPACITOR
	C12	QEK61HM-105	E CAPACITOR
	C13	QCYA1HK-103	CAPACITOR
	C14	QEK61AM-336	E CAPACITOR
	C15	QCYA1HK-103	CAPACITOR
	C16	QEK61HM-105	E CAPACITOR
	C17	QCYA1HK-103	CAPACITOR
	C18	QCSA1HJ-150	CAPACITOR
	C19	PU57672-700	TANTAL CAPACITOR,VCXO
	C20	QCSA1HJ-101	CAPACITOR
	C21	QCYA1HK-102	CAPACITOR
	C22	QEK61HM-105	E CAPACITOR
	C23	QCYA1HK-102	CAPACITOR
	C24	QEK61HM-224	E CAPACITOR
	C25	QCFA1EZ-683	CAPACITOR
	C26	QEK61HM-105	E CAPACITOR
	C27	QCTA1CH-681	CAPACITOR
	C28	QEK61AM-336	E CAPACITOR
	C29	QCYA1HK-103	CAPACITOR
	C30	QCFA1EZ-104	CAPACITOR
	C31	QCYA1HK-103	CAPACITOR
	C32	QCFA1HZ-473	CAPACITOR
	C33	QEK61CM-106	E CAPACITOR
	C34	QCYA1HK-103	CAPACITOR
	C35	QCYA1HK-103	CAPACITOR
	C36	QEK61HM-105	E CAPACITOR
	C37	QEK61AM-107	E CAPACITOR
	C38	QCSA1HJ-8R0	CAPACITOR
	C39	QCSA1HJ-180	CAPACITOR
	C40	QCYA1HK-103	CAPACITOR
	C41	QCFA1HZ-473	CAPACITOR
	C42	QEK61CM-106	E CAPACITOR
	C43	QCYA1HK-103	CAPACITOR
	C44	QCYA1HK-103	CAPACITOR
	C45	QCYA1HK-103	CAPACITOR
	C46	QEK61AM-336	E CAPACITOR
	C47	QCYA1HK-103	CAPACITOR
	C48	QEK61AM-336	E CAPACITOR
	C49	QEK61HM-105	E CAPACITOR
	C50	QCFA1HZ-473	CAPACITOR
	C51	QCYA1HK-103	CAPACITOR
	C52	QEK61HM-105	E CAPACITOR
	C53	QEF81CM-474	TANTAL CAPACITOR
	C54	QEK61HM-105	E CAPACITOR
	C55	QCFA1HZ-473	CAPACITOR
	C56	QEK61HM-474	E CAPACITOR
	C57	QCYA1HK-103	CAPACITOR
	C58	QEK61AM-336	E CAPACITOR
	C59	QCYA1HK-102	CAPACITOR
	C60	QCYA1HK-103	CAPACITOR
	C61	QCYA1HK-103	CAPACITOR
	C62	QEK61HM-105	E CAPACITOR
	C63	QCYA1HK-103	CAPACITOR
	C64	QEK61AM-336	E CAPACITOR
	C65	QCYA1HK-103	CAPACITOR
	C66	QEK61HM-105	E CAPACITOR
	C67	QCYA1HK-103	CAPACITOR
	C68	QCSA1HJ-150	CAPACITOR
	C69	PU57672-700	TANTAL CAPACITOR,VCXO
	C70	QCSA1HJ-101	CAPACITOR
	C71	QCYA1HK-102	CAPACITOR
	C72	QCFA1EZ-683	CAPACITOR
	C73	QEK61HM-105	E CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C74	QCTA1CH-681	CAPACITOR
	C75	QCYA1HK-103	CAPACITOR
	C76	QEK61AM-336	E CAPACITOR
	C77	QCFA1EZ-104	CAPACITOR
	C78	QCTA1UJ-330	CAPACITOR
	C79	QCYA1HK-103	CAPACITOR
	C80	QCTA1UJ-330	CAPACITOR
	C81	QCYA1HK-103	CAPACITOR
	C82	QEK61EM-475	E CAPACITOR
	C83	QCSA1HJ-270	CAPACITOR
	C84	QCSA1HJ-270	CAPACITOR
	C85	QCYA1HK-103	CAPACITOR
	C86	QCYA1HK-103	CAPACITOR
	C87	QCYA1HK-102	CAPACITOR
	C88	QCYA1HK-103	CAPACITOR
	C89	QCYA1HK-103	CAPACITOR
	C90	QCSA1HJ-471	CAPACITOR
	C91	QEK61CM-106	E CAPACITOR
	C92	QCYA1HK-472	CAPACITOR
	C93	QCYA1HK-103	CAPACITOR
	C94	QCYA1HK-103	CAPACITOR
	C95	QCYA1HK-103	CAPACITOR
	C96	QCYA1HK-103	CAPACITOR
	C97	QCSA1HJ-471	CAPACITOR
	C98	QEK61CM-106	E CAPACITOR
	C99	QCYA1HK-472	CAPACITOR
	C100	QCYA1HK-103	CAPACITOR
	C101	QCYA1HK-103	CAPACITOR
	C102	QCYA1HK-103	CAPACITOR
	C103	QCYA1HK-103	CAPACITOR
	C104	QCYA1HK-103	CAPACITOR
	C105	QCYA1HK-103	CAPACITOR
	C106	QEK60JM-107	E CAPACITOR
	C107	QCYA1HK-103	CAPACITOR
	C108	QEK60JM-107	E CAPACITOR
	C109	QCYA1HK-103	CAPACITOR
	C110	QEK60JM-107	E CAPACITOR
	C111	QCYA1HK-103	CAPACITOR
	C112	QCYA1HK-103	CAPACITOR
	C113	QCYA1HK-103	CAPACITOR
	C114	QCYA1HK-103	CAPACITOR
	C116	QEK61AM-336	E CAPACITOR
	C117	QEK61AM-336	E CAPACITOR
	C118	QER61AM-336	E CAPACITOR
	C119	QCYA1HK-103	CAPACITOR
	C120	QCTA1CH-470	CAPACITOR
	C121	QCTA1CH-101	CAPACITOR
	C123	QCYA1HK-103	CAPACITOR
	C124	QCYA1HK-103	CAPACITOR
	C125	QCSA1HJ-561	CAPACITOR
	C126	QCSA1HJ-561	CAPACITOR
	C127	QCYA1HK-103	CAPACITOR
	C129	QEF80JM-106	T CAPACITOR
	C131	QCYA1HK-103	CAPACITOR
	C132	QCTA1CH-271	CAPACITOR
	C133	QCTA1CH-181	CAPACITOR
	C134	QEF80JM-225	TANTAL CAPACITO
	C135	QCF11HJ-102	CAPACITOR
	C136	QCF11HJ-102	CAPACITOR
	L1	PU60480-101JZ	COIL, 100 MICRO
	L2	PU60480-101JZ	COIL, 100 MICRO
	L3	PU60480-4R7KZ	COIL, 4.7 MICRO
	L4	PU60480-150JZ	COIL, 15 MICRO
	LPF1	PU60441	LOW PASS FILTER
	LPF2	PU60441	LOW PASS FILTER
	LPF3	PU60445	LOW PASS FILTER
	BPF1	PU60446	BAND PASS FILTER
	CF1	PU60440	RESONATOR
	LC1	PU59736-223	N FILTER
	LC2	PU59736-223	N FILTER
	LC28	PU59736-223	N FILTER
	LC29	PU59736-223	N FILTER
	LC30	PU59736-223	N FILTER
	LC31	PU59736-223	N FILTER
	LC32	PU59736-223	N FILTER

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	LC33	PU59736-223	N FILTER
	LC34	PU59736-223	N FILTER
	LC35	PU59736-223	N FILTER
	LC36	PU59736-223	N FILTER
	LC37	PU59736-223	N FILTER
	LC38	PU59736-223	N FILTER
	LC39	PU59736-223	N FILTER
	LC40	PU59736-223	N FILTER
	X1	PU60438	CRYSTAL RESONATOR
	X2	PU60438	CRYSTAL RESONATOR
	X3	PU60439	CRYSTAL RESONATOR
	TH1	ERT-D2ZFL102S	THERMISTOR
	CL1	PU49485-4	WIRE CLAMP, X2
	SCW1	SDST3006Z	TAPPING SCREW, X3
	SLD1	PQ32344-1-1	SHIELD FLAME
	SLD2	PQ32342-1-1	SHIELD FLAME
	SLD3	PQ32341-1-1	SHIELD FLAME
	SPC1	PQM30029-54	SPACER
		-DIGITAL SUB BOARD ASSEMBLY-	
	PWBA	PB40026A	DIGITAL SUB BOARD ASSY
	Q1	DTC144EF	TRANSISTOR
	Q2	DTC144EF	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	MA27	DIODE
	R1	QRD162J-103	RESISTOR
	R2	QRD162J-103	RESISTOR
	R3	QRD162J-472	RESISTOR
		-CNN BOARD ASSEMBLY-	
	PWBA	PB40031A-01	CNN BOARD ASSY
	R1	QRD161J-102	RESISTOR
	R2	QRD161J-102	RESISTOR
	R3	QRD161J-471	RESISTOR
	R4	QRD161J-561	RESISTOR
	R5	QRD161J-471	RESISTOR
	R6	QRD161J-561	RESISTOR
	C1	QCZ0126-102	CAPACITOR
	C2	QCZ0126-102	CAPACITOR
	C3	QCZ0125-101	CAPACITOR
	C4	QCZ0125-101	CAPACITOR
	C5	QCZ0125-101	CAPACITOR
	C6	QCZ0125-101	CAPACITOR
	C7	QCZ0125-101	CAPACITOR
	C8	QCZ0125-101	CAPACITOR
	C9	QCZ0125-101	CAPACITOR
	C10	QCZ0125-101	CAPACITOR
	C11	QCZ0126-331	CAPACITOR
	C12	QCZ0126-331	CAPACITOR
	C13	QCZ0126-331	CAPACITOR
	C14	QCZ0126-331	CAPACITOR
	C15	QCZ0126-331	CAPACITOR
	C16	QCZ0126-331	CAPACITOR
	C17	QCZ0126-331	CAPACITOR
	C18	QCZ0126-331	CAPACITOR
	C19	QEK61HM-225	E CAPACITOR
	K1	PU60529	BEADS CORE
	BKT1	PQ32343-1-1	BRACKET
	SCW1	SDST3006Z	TAPPING SCREW,X2
	SCW2	SDST3005Z	TAPPING SCREW,X2
	SPC1	PQM30029-54	SPACER,X2
	CN1	PU58844-14	CAP HOUSING
	CN2	PU58844-9	CAP HOUSING
	CN3	PU58844-2	CAP HOUSING

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
		-CNN SUB BOARD ASSEMBLY-	
	PWBA	PB40032A-01	CNN SUB BOARD ASSY
	C1	QCZ0124-331	CAPACITOR
	C2	QCZ0124-331	CAPACITOR
	C3	QCZ0124-331	CAPACITOR
	C4	QCZ0124-331	CAPACITOR
	C5	QCZ0124-331	CAPACITOR
	C6	QCZ0124-331	CAPACITOR
	C7	QCZ0124-331	CAPACITOR
	C8	QCZ0124-331	CAPACITOR
	C9	QCZ0124-331	CAPACITOR
	C10	QCZ0124-331	CAPACITOR
	BKT1	PQ43392	BRACKET
	SPC1	PQM30029-111	SPACER,X2
	CN1	PU58844-2	CAP HOUSING
	CN2	PU59555-8	CAP HOUSING

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* 15. ON SCREEN BOARD ASSEMBLY <17> *
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	PWBA	PB20170A-01	ON SCREEN BOARD ASSY
	IC1	M889010A-108	IC
	IC101	M50925-616SP	IC
	Q1	2SA1309R,S	TRANSISTOR
	Q3	2SA1309R,S	TRANSISTOR
	Q5	DTA124ES	TRANSISTOR
	Q7	DTC114ES	TRANSISTOR
	Q8	2SA933S(RS)	TRANSISTOR
	Q9	DTC114ES	TRANSISTOR
	D1	1SS133	DIODE
	D2	LTZ-MR15	DIODE
	R1	QRD161J-102	RESISTOR
	R2	QRD161J-102	RESISTOR
	R3	QRD161J-222	RESISTOR
	R4	QRD161J-222	RESISTOR
	R5	QRD161J-472	RESISTOR
	R6	QRD161J-102	RESISTOR
	R7	QRD161J-472	RESISTOR
	R8	QRD161J-472	RESISTOR
	R9	QRD161J-472	RESISTOR
	R10	QRD161J-472	RESISTOR
	R11	QRD161J-472	RESISTOR
	R14	QRD161J-471	RESISTOR
	R15	QRD161J-154	RESISTOR
	R17	QRD161J-104	RESISTOR
	R18	QRD161J-681	RESISTOR
	R19	QRD161J-681	RESISTOR
	R20	QRD161J-472	RESISTOR
	R22	QRD161J-222	RESISTOR
	R25	QRD161J-474	RESISTOR
	R26	QRD161J-103	RESISTOR
	R27	QRD161J-103	RESISTOR
	R28	QRD161J-102	RESISTOR
	R29	QRD161J-102	RESISTOR
	R30	QRD161J-222	RESISTOR
	R38	QRD161J-152	RESISTOR
	R39	QRD161J-222	RESISTOR
	R109	QRD161J-472	RESISTOR
	R110	QRD161J-472	RESISTOR
	R111	QRD161J-472	RESISTOR
	R112	QRD161J-332	RESISTOR
	R113	QRD161J-105	RESISTOR
	R114	QRD161J-472	RESISTOR
	R115	QRD161J-472	RESISTOR
	R116	QRD161J-472	RESISTOR
	R117	QRD161J-103	RESISTOR
	R118	QRD161J-103	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C1	QCSB1HJ-150	CAPACITOR
	C3	QCSB1HJ-330	CAPACITOR
	C4	PU57672-400	TRIMMER CAPACITOR
	C5	QEK61CM-106	E CAPACITOR
	C7	QER61EM-335	E CAPACITOR
	C8	QCBB1HJ-331	CAPACITOR
	C14	PU57672-300	TRIMMER CAPACITOR
	C15	QCVB1CN-103	CAPACITOR
	C16	PU57601-335MC	E CAPACITOR
	C17	QCVB1CN-103	CAPACITOR
	C18	QET60JM-107	E CAPACITOR
	C19	QCF11HP-473	CAPACITOR
	C20	QCSB1HJ-560	CAPACITOR
	C101	QCBB1HJ-101	CAPACITOR
	C102	QCBB1HJ-101	CAPACITOR
	C103	QCC11EK-473	CAPACITOR
	L1	PU58333-180K	PEAKING COIL,18 MICRO
⚠	CF101	PU60196	RESONETOR
⚠	X1	PU59965	CRYSTAL RESONATOR
	TP	PU56008	TEST-PIN, X3
	CN101	PU58844-4	CAP HOUSING
	CN102	PU58844-10	CAP HOUSING

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* 16. TIMER BOARD ASSEMBLY <20> *
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	PWBA	PB20171B	TIMER BOARD ASSY
	IC1	M50959-613SP	IC
	IC2	M58658P	IC
	IC3	UPC393C	IC
	IC4	S-8053HLB	IC
⚠	Q1	2SC3311A(RS)	TRANSISTOR
	Q2	2SC1685R,S	TRANSISTOR
	Q3	2SC3311A(RS)	TRANSISTOR
	Q101	2SC3311A(RS)	TRANSISTOR
	Q102	DTC144ES	TRANSISTOR
	Q103	DTC144ES	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	RD5.6ES-T1B3	ZENER DIODE
	D5	1SS132	DIODE
⚠	D6	RD9.1ES-T1B2	ZENER DIODE
	D7	1SS133	DIODE
	D8	1SS132	DIODE
	D101	1SS133	DIODE
	R1	QRD161J-122	RESISTOR
	R2	QRD161J-102	RESISTOR
	R3	QRD161J-472	RESISTOR
	R4	QRD161J-474	RESISTOR
	R5	QRD161J-334	RESISTOR
	R6	QRD161J-475	RESISTOR
	R7	QRD161J-105	RESISTOR
	R8	QRD161J-472	RESISTOR
	R9	QRD161J-682	RESISTOR
	R10	QRD161J-104	RESISTOR
	R11	QRD161J-103	RESISTOR
	R12	QRD161J-471	RESISTOR
	R13	QRD161J-473	RESISTOR
	R15	QRD161J-473	RESISTOR
	R16	QRD161J-474	RESISTOR
	R17	QRD161J-103	RESISTOR
	R18	QRD161J-103	RESISTOR
	R19	QRD161J-472	RESISTOR
	R20	QRD161J-472	RESISTOR
	R21	QRD161J-472	RESISTOR
	R22	QRD161J-222	RESISTOR
	R23	QRD161J-684	RESISTOR
	R24	QRD161J-474	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R33	QRD161J-104	RESISTOR
	R34	QRD161J-102	RESISTOR
	R38	QRD161J-472	RESISTOR
	R39	QRD161J-472	RESISTOR
	R40	QRD161J-472	RESISTOR
	R41	QRD161J-224	RESISTOR
	R42	QRD161J-472	RESISTOR
	R43	QRD161J-472	RESISTOR
	R44	QRD161J-472	RESISTOR
	R45	QRD161J-472	RESISTOR
	R46	QRD161J-472	RESISTOR
	R47	QRD161J-472	RESISTOR
	R48	QRD161J-472	RESISTOR
	R49	QRD161J-472	RESISTOR
	R50	QRD161J-472	RESISTOR
	R51	QRD161J-472	RESISTOR
	R52	QRD161J-472	RESISTOR
	R53	QRD161J-472	RESISTOR
	R54	QRD161J-472	RESISTOR
	R55	QRD161J-472	RESISTOR
	R56	QRD161J-472	RESISTOR
	R57	QRD161J-472	RESISTOR
	R58	QRD161J-472	RESISTOR
	R59	QRD161J-472	RESISTOR
	R61	QRD161J-472	RESISTOR
	R62	QRD161J-472	RESISTOR
	R63	QRD161J-472	RESISTOR
	R64	QRD161J-472	RESISTOR
	R65	QRD161J-472	RESISTOR
	R66	QRD161J-472	RESISTOR
	R67	QRD161J-102	RESISTOR
	R68	QRD161J-224	RESISTOR
	R69	QRD161J-102	RESISTOR
	R70	QRD161J-472	RESISTOR
	R71	QRD161J-472	RESISTOR
	R101	QRD161J-333	RESISTOR
	R102	QRD161J-103	RESISTOR
	RA1	QRB047J-104	RESISTOR NETWORK
	OR	QRB049J-104	RESISTOR NETWORK
	RA2	QRB047J-224	RESISTOR NETWORK
	OR	QRB049J-224	RESISTOR NETWORK
	RA3	QRB037J-223	RESISTOR NETWORK
	OR	QRB039J-223	RESISTOR NETWORK
	RA5	QRB047J-222	RESISTOR NETWORK
	OR	QRB049J-222	RESISTOR ARRAY
	C1	QEK61CM-336	E CAPACITOR
	C2	QEK61CM-106	E CAPACITOR
	C3	QEK60JM-476	E CAPACITOR
	C4	PU59421-104	E CAPACITOR
	C5	QEK60JM-476	E CAPACITOR
	C6	QCF31HP-103	CAPACITOR
	C7	QEK61CM-106	E CAPACITOR
	C8	QCS31HJ-330	CAPACITOR
	C9	PU57672-400	TRIMMER CAPACITOR
	C10	QCC11EJ-104	CAPACITOR
	C11	QCF31HP-102	CAPACITOR
	C12	QCF31HP-102	CAPACITOR
	C13	QCF31HP-103	CAPACITOR
	C14	QCF31HP-102	CAPACITOR
	C101	QER61CM-226	E CAPACITOR
	C102	QER61CM-226	E CAPACITOR
	C103	QEK61HM-105	E CAPACITOR
⚠	CF1	PU58428	RESONATOR
⚠	OR	PU59576	RESONATOR
⚠	X1	PU58394	CRYSTAL RESONATOR
	SPC1	PU59210-001	W.LOKING SPACER, X2
	TP1	PU56008	TEST-PIN
	TP2	PU56008	TEST-PIN
	TP3	PU56008	TEST-PIN
	TP4	PU56008	TEST-PIN
	TP5	PU56008	TEST-PIN
	CN1	PU58844-4	CAP HOUSING
	CN2	PU60417-8	CAP HOUSING
	CN3	PU60417-6	CAP HOUSING
	CN4	PU58844-102R	CAP HOUSING
	CN5	PU60417-105	CAP HOUSING
	CN6	PU58844-103	CAP HOUSING
	CN9	PU58798-114	FPC CONNECTER
	CN11	PU59555-102	CAP HOUSING

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* 17. CONTROL BOARD ASSEMBLY <24> *
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	PWBA	PB10081A-01	CONTROL BOARD ASSY
	D401	1SS132	DIODE
	D402	1SS132	DIODE
	D403	1SS132	DIODE
	D404	1SS132	DIODE
	D409	1SS132	DIODE
	R1	QRD161J-103	RESISTOR
	R211	QRD161J-222	RESISTOR
	R212	QRD161J-222	RESISTOR
	R213	QRD161J-332	RESISTOR
	R214	QRD161J-472	RESISTOR
	R215	QRD161J-103	RESISTOR
	R216	QRD161J-223	RESISTOR
	R217	QRD161J-222	RESISTOR
	R218	QRD161J-222	RESISTOR
	R219	QRD161J-332	RESISTOR
	R220	QRD161J-472	RESISTOR
	R221	QRD161J-103	RESISTOR
	R222	QRD161J-223	RESISTOR
	R227	QRD161J-103	RESISTOR
	R228	QRD161J-223	RESISTOR
	R401	PU60390	V RESISTOR, V.LOCK
	R402	PU59092-12	V RESISTOR, P.SHARP
	R403	PU59092-2	V RESISTOR, H.PHONE
	R404	PU59092-1	SLIDE VOLUME, REC LEVEL (L)(R)
	S1	PU59092-14	SWITCH(TACT), 1/SUN
	S2	PU59092-14	SWITCH(TACT), 2/MON
	S3	PU59092-14	SWITCH(TACT), 3/TUE
	S4	PU59092-14	SWITCH(TACT), 4/WED
	S5	PU59092-14	SWITCH(TACT), 5/THU
	S6	PU59092-14	SWITCH(TACT), 6/FRI
	S7	PU59092-14	SWITCH(TACT), 7/SAT
	S8	PU59092-14	SWITCH(TACT), 8/2ND
	S9	PU59092-14	SWITCH(TACT), 9/DAI
	S10	PU59092-14	SWITCH(TACT), 0/
	S11	PU59092-14	SWITCH(TACT), GO-TO
	S12	PU59092-14	SWITCH(TACT), ENTER
	S13	PU59092-14	SWITCH(TACT), RESET
	S14	PU59092-14	SWITCH(TACT), CH UP
	S15	PU59092-14	SWITCH(TACT), REC/OTR
	S16	PU59092-14	SWITCH(TACT), SP/EP
	S17	PU59092-14	SWITCH(TACT), COUN/REMAI
	S18	PU59092-14	SWITCH(TACT), CH DOWN
	S19	PU59092-14	SWITCH(TACT), SAP REC
	S21	PU59092-14	SWITCH(TACT), CLOCK ADJ
	S22	PU59092-14	SWITCH(TACT), PROGRAM
	S23	PU59092-14	SWITCH(TACT), TIMER
	S24	PU59092-14	SWITCH(TACT), CANCEL/SKI
	S26	PU59092-14	SWITCH(TACT), ON SCREEN
	S27	PU59092-14	SWITCH(TACT), AM/PM/SC
	S201	PU59092-14	SWITCH(TACT), STOP
	S202	PU59092-14	SWITCH(TACT), PAUSE
	S203	PU59092-14	SWITCH(TACT), PLAY
	S204	PU59092-14	SWITCH(TACT), REW
	S205	PU59092-14	SWITCH(TACT), FF
	S206	PU59092-14	SWITCH(TACT), SEARCH -
	S207	PU59092-14	SWITCH(TACT), SEARCH +
	S208	PU59092-14	SWITCH(TACT), AUDIO DUB
	S209	PU59092-14	SWITCH(TACT), INSERT
	S211	PU59092-14	SWITCH(TACT), ERASE
	S212	PU59092-14	SWITCH(TACT), TRACKING -
	S213	PU59092-14	SWITCH(TACT), MARK

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	S214	PU59092-14	SWITCH(TACT), VISS
	S220	PU59092-14	SWITCH(TACT), AUDIO MON
	S221	PU59092-14	SWITCH(TACT), TRACKING +
	S401	PU59092-6	SWITCH, INPUT SEL
	S402	PU54440	SWITCH, COUN MEMORY
	S403	PU54440	SWITCH, AFC
	S404	QSS1A13-L01	SWITCH, BAND
	S405	PU54440	SWITCH, EDIT
	S406	PU59092-6	SWITCH, LEVEL IND
	S407	PU54440	SWITCH, ALC
	S408	PU54440	SWITCH, AC ONLINE
	S409	PU54440	SWITCH, AUTO TITLE
	SPC1	PQM30029-104	SPACER
	SPC2	PQM30029-105	SPACER
	WR1	PU36448-3	FLAT WIRE
	WR2	PU60382	FPC

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* 18. FRONT BOARD ASSEMBLY <25><32> *
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	PWBA	PB20176A-02	FRONT BOARD ASSY <25><32>
		-POWER SWITCH BOARD ASSEMBLY <25>-	
	PWBA1	PB20176A1-02	POWER SWITCH BOARD ASSY <25>
	IC1	GP1U501	INFRATED RAYS UNIT
	OR	SPS-403	INFRATED RAYS UNIT
	D201	SLV-31MC3F	LE DIODE
	D202	SLV-31MC3F	LE DIODE
	R1	QRD161J-181	RESISTOR
	R2	QRD161J-181	RESISTOR
	R223	QRD161J-222	RESISTOR
	R224	QRD161J-222	RESISTOR
	R225	QRD161J-332	RESISTOR
	R250	QRD161J-223	RESISTOR
	C1	QCB81HJ-102	CAPACITOR
	C201	QEK61AM-476	E CAPACITOR
	S215	PU57551	SWITCH(TACT), POWER
	S216	PU57551	SWITCH(TACT), EJECT
	S217	PU57551	SWITCH(TACT), TV/VIDEO
	SLD1	PQ31764	SHADE (LED)
	J401	PU58356-2	JACK(HEADPHONE)
	J402	PU58355-2	MIC JACK
	CN6	PU58844-103	CAP HOUSING
		-LED BOARD ASSEMBLY <32>-	
	PWBA2	PB20176A2-02	LED BOARD ASSY <32>
	D203	SLR-37VR3F	LE DIODE
	D204	SLR-37VR3F	LE DIODE
	D205	SLR-37VR3F	LE DIODE
	D206	SLR-37VR3F	LE DIODE
	D211	SLR-37VR3F	LE DIODE
	D212	SLR-37VR3F	LE DIODE
	D213	SLR-37VR3F	LE DIODE
	D214	SLR-37VR3F	LE DIODE
	D215	GL-3EG43	LE DIODE
	D216	GL-3EG43	LE DIODE
	D217	GL-3EG43	LE DIODE
	D218	GL-3EG43	LE DIODE
	D219	GL-3EG43	LE DIODE
	D220	GL-3EG43	LE DIODE
	D221	GL-3EG43	LE DIODE
	D222	GL-3EG43	LE DIODE
	D223	GL-3EG43	LE DIODE
	D224	GL-3EG43	LE DIODE

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D225	GL-3EG43	LE DIODE
	D226	GL-3EG43	LE DIODE
	R101	QRD161J-271	RESISTOR
	R102	QRD161J-561	RESISTOR
	R103	QRD161J-561	RESISTOR
	R104	QRD161J-331	RESISTOR
	R105	QRD161J-331	RESISTOR
	SLD1	PQ20548-1-4	SHADE(LED)

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* 19. DISPLAY BOARD ASSEMBLY <27> *
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	PWBA	PB20177A-01	DISPLAY BOARD ASSY
	IC101	MSC7110-01SS	IC
	IC102	MSC1124BRS	IC
	Q1	DTC144EF	TRANSISTOR
	Q2	DTC144ES	TRANSISTOR
	Q3	2SA1309R,S	TRANSISTOR
	Q102	DTC124ES	TRANSISTOR
	Q103	DTA114ES	TRANSISTOR
	D102	1SS132	DIODE
	D103	1SS132	DIODE
	D104	RD8.2ES-T1B2	ZENER DIODE
	D105	1SS132	DIODE
	D106	RD3.0ES-T1B2	ZENER DIODE
	D107	RD24ES-T1B2	ZENER DIODE
	D207	SLH-34VC3F	LE DIODE
	D208	SLH-34VC3F	LE DIODE
	D209	SLH-34VC3F	LE DIODE
	D210	SLH-34VC3F	LE DIODE
	R1	QRD161J-331	RESISTOR
	R2	QRD161J-331	RESISTOR
	R3	QRD161J-103	RESISTOR
	R4	QRD161J-473	RESISTOR
	R101	QRD161J-103	RESISTOR
	R107	QRD161J-393	RESISTOR
	R108	QRD161J-333	RESISTOR
	R111	QRD161J-104	RESISTOR
	R112	QRD161J-103	RESISTOR
	R113	QRD161J-151	RESISTOR
	R114	QRD161J-104	RESISTOR
	R115	QRD161J-103	RESISTOR
	R116	QRD161J-151	RESISTOR
	R117	QRD161J-103	RESISTOR
	R118	QRD161J-103	RESISTOR
	R119	QRD161J-103	RESISTOR
	R209	QRD161J-181	RESISTOR
	R210	QRD161J-181	RESISTOR
	RA101	QRB037J-472	RESISTOR NETWORK
	C101	QCC11EJ-473	CAPACITOR
	C102	QER61HM-104	E CAPACITOR
	C103	QCB81HJ-101	CAPACITOR
	C104	QER61HM-105	E CAPACITOR
	C105	QER61HM-475	E CAPACITOR
	C106	QER61HM-225	E CAPACITOR
	C107	QFJ41HJ-223	M CAPACITOR
	C108	QER61CM-106	E CAPACITOR
	C109	QER61CM-106	E CAPACITOR
	C110	QEK60JM-227	E CAPACITOR
	C111	QCF31HP-473	CAPACITOR
	C112	QCF31HP-223	CAPACITOR
	C113	QER41VM-106	E CAPACITOR
	FDP	PU59952	FLUORESCENT DISPLAY PANEL
	HD1	PQ43223	LED HOLDER
	HD2	PQ31309	FDP HOLDER (L)
	HD3	PQ31310	FDP HOLDER (R)
	CN5	PU59513-4	CAP HOUSING
	CN6	PU59555-103	CAP HOUSING

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION

20. JUNCTION BOARD ASSEMBLY <35>

	PWBA	PB20180B-01	JUNCTION BOARD ASSY
	IC1	M5218P	IC
	IC103	UPC7805H	IC
	Q1	2SC3311A	TRANSISTOR
	Q2	2SC1740S(Q)	TRANSISTOR
	Q3	2SC1740S(Q)	TRANSISTOR
	Q4	2SC1740S(RS)	TRANSISTOR
	Q101	2SC1740S(RS)	TRANSISTOR
	Q103	DTC144ES	TRANSISTOR
	D1	1SS133	DIODE
	OR	MA165	DIODE
	D101	1SS133	DIODE
	D102	1SS133	DIODE
	R1	QRD161J-122	RESISTOR
	R2	QRD161J-103	RESISTOR
	R3	QRD161J-154	RESISTOR
	R4	QRD161J-154	RESISTOR
	R7	QRD161J-101	RESISTOR
	R8	QRD161J-101	RESISTOR
	R9	QRD161J-102	RESISTOR
	R10	QRD161J-102	RESISTOR
	R11	QRD161J-103	RESISTOR
	R12	QRD161J-103	RESISTOR
	R13	QRD161J-392	RESISTOR
	R14	QRD161J-392	RESISTOR
	R15	QRD161J-102	RESISTOR
	R16	QRD161J-223	RESISTOR
	R17	QRD161J-273	RESISTOR
	R18	QRD161J-104	RESISTOR
	R19	QRD161J-124	RESISTOR
	R20	QRD161J-222	RESISTOR
	R21	QRD161J-823	RESISTOR
	R22	QRD161J-221	RESISTOR
	R23	QRD161J-473	RESISTOR
	R24	QRD161J-222	RESISTOR
	R101	QRD161J-333	RESISTOR
	R102	QRD161J-222	RESISTOR
	R103	QRD161J-333	RESISTOR
	R104	QRD161J-473	RESISTOR
	C1	QETC1CM-476	E CAPACITOR
	C2	QETC1CM-106	E CAPACITOR
	C3	QETC1HM-105	E CAPACITOR
	C4	QETC1HM-105	E CAPACITOR
	C5	QEP61HM-335	E CAPACITOR
	C6	QEP61HM-335	E CAPACITOR
	C7	QETC1CM-476	E CAPACITOR
	C8	QETC1HM-105	E CAPACITOR
	C9	QETC1CM-476	E CAPACITOR
	C10	QCBB1HJ-101	CAPACITOR
	C11	QETC1CM-106	E CAPACITOR
	C12	QETC1HM-105	E CAPACITOR
	C13	QETC1HM-105	E CAPACITOR
	C107	QETA1AM-107	E CAPACITOR
	C108	QCC31CJ-104	CAPACITOR
	C109	QETA1AM-107	E CAPACITOR
	HS1	PQ43262	HEAT SINK, FOR IC103
	SCW1	SDST3006Z	TAPPING SCREW, FOR H.SINC
	SLD1	PQ42581	PRE AMP SHIELD1
	SLD2	PQ42582	PRE AMP SHIELD2
	SLD3	PQ42583	PRE AMP SHIELD3
	CN5	PU60417-8	CAP HOUSING
	CN6	PU60417-5	CAP HOUSING
	CN7	PU58844-3	CAP HOUSING
	CN8	PU58844-3	CAP HOUSING
	CN10	PU58844-2	CAP HOUSING
	CN11	PU58844-2	CAP HOUSING
	CN12	PU58844-2	CAP HOUSING
	CN13	PU60417-9	CAP HOUSING
	CN14	PU58844-3	CAP HOUSING
	CN15	PU58844-2	CAP HOUSING
	CN16	PU58844-2	CAP HOUSING
	CN17	PU58844-2	CAP HOUSING
	CN18	PU58844-2	CAP HOUSING
	CN19	PU58844-3Y	CAP HOUSING
	CN20	PU58844-2	CAP HOUSING
	CN21	PU58844-3	CAP HOUSING
	CN22	PU58844-3	CAP HOUSING
	CN23	PU58844-3	CAP HOUSING

21. STEP BOARD ASSEMBLY <37>

	PWBA	PB30047A	STEP BOARD ASSY
	Q1	DTA114ES	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	R1	QRD161J-332	RESISTOR
	R2	QRD161J-332	RESISTOR
	R3	QRD161J-103	RESISTOR
	R226	QRD161J-472	RESISTOR
	CN1	PU58798-126	FFC CONNECTOR
	CN9	PU58844-3	CAP HOUSING

22. UPPER DRUM BOARD <41>

	PWB1	PDM3161	UPPER DRUM BOARD,X2

23. PRE/REC BOARD ASSEMBLY <43>

	PWBA	PB10079B	PRE/REC BOARD ASSY
	IC1	HA118019NT	IC
	IC3	AN6392	IC
	IC4	BU4030BF	IC
	Q1	2SC2412K	TRANSISTOR
	Q2	2SC2412K	TRANSISTOR
	Q11	2SA1037K	TRANSISTOR
	Q12	2SA1037K	TRANSISTOR
	Q13	DTC144EK	TRANSISTOR
	Q14	DTC144EK	TRANSISTOR
	Q15	DTA124EK	TRANSISTOR
	Q16	DTC144EK	TRANSISTOR
	Q17	DTA124EK	TRANSISTOR
	Q109	2SC2412K	TRANSISTOR
	Q110	2SA1037K	TRANSISTOR
	Q111	2SC2412K	TRANSISTOR
	Q112	2SC2412K	TRANSISTOR
	Q113	DTC144EK	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D5	DAN202K	DIODE
	D6	DAN202K	DIODE
	D7	1SS133	DIODE

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R1	QRSA08J-122YN	RESISTOR
	R2	QRSA08J-122YN	RESISTOR
	R3	QRSA08J-560YN	RESISTOR
	R4	QRSA08J-560YN	RESISTOR
	R5	QRSA08J-330YN	RESISTOR
	R6	QRSA08J-470YN	RESISTOR
	R7	QRSA08J-103YN	RESISTOR
	R8	QRSA08J-474YN	RESISTOR
	R9	QRSA08J-122YN	RESISTOR
	R10	QRSA08J-122YN	RESISTOR
	R11	QRSA08J-334YN	RESISTOR
	R12	QRSA08J-223YN	RESISTOR
	R13	QRSA08J-223YN	RESISTOR
	R16	QRSA08J-223YN	RESISTOR
	R29	QRSA08J-333YN	RESISTOR
	R45	QRSA08J-271YN	RESISTOR
	R46	QRSA08J-102YN	RESISTOR
	R47	QRSA08J-102YN	RESISTOR
	R50	QRSA08J-623YN	RESISTOR
	R51	QRSA08J-101YN	RESISTOR
	R52	QRSA08J-560YN	RESISTOR
	R53	QRSA08J-102YN	RESISTOR
	R54	QRSA08J-223YN	RESISTOR
	R55	QRSA08J-183YN	RESISTOR
	R56	QRSA08J-273YN	RESISTOR
	R57	QRSA08J-222YN	RESISTOR
	R59	QRSA08J-222YN	RESISTOR
	R60	QRSA08J-103YN	RESISTOR
	R61	QRSA08J-103YN	RESISTOR
	R68	QRSA08J-393YN	RESISTOR
	R69	QRSA08J-393YN	RESISTOR
	R71	QRSA08J-104YN	RESISTOR
	R72	QRSA08J-102YN	RESISTOR
⚠	R73	PU52108-150	POSISTOR
⚠	OR	PU52108-150T	POSISTOR
	R75	QRD182J-183	RESISTOR
	R113	QRSA08J-681YN	RESISTOR
	R116	QRSA08J-153YN	RESISTOR
	R117	QRSA08J-273YN	RESISTOR
	R129	QRSA08J-681YN	RESISTOR
	R130	QRSA08J-561YN	RESISTOR
	R131	QRSA08J-821YN	RESISTOR
	R132	QRSA08J-271YN	RESISTOR
	R133	QRSA08J-681YN	RESISTOR
	R134	QRSA08J-821YN	RESISTOR
	R135	QRSA08J-681YN	RESISTOR
	R136	QRSA08J-102YN	RESISTOR
	R137	QRSA08J-122YN	RESISTOR
	R138	QRSA08J-333YN	RESISTOR
	R139	QRSA08J-223YN	RESISTOR
	R140	QRD161J-681	RESISTOR
	R141	QRD161J-102	RESISTOR
	C3	QCFA1HZ-103	CAPACITOR
	C4	QCFA1HZ-103	CAPACITOR
	C5	QETC0JM-476	E CAPACITOR
	C6	QCY81EK-223ZL	CAPACITOR
	C7	QCYA1HK-152	CAPACITOR
	C10	PU59758-105	CAPACITOR
	C11	PU59758-105	CAPACITOR
	C14	QCYA1HK-152	CAPACITOR
	C15	QCYA1HK-152	CAPACITOR
	C18	PU59758-105	CAPACITOR
	C19	PU59758-105	CAPACITOR
	C22	QCYA1HK-152	CAPACITOR
	C24	QCFA1HZ-103	CAPACITOR
	C25	QETC1HM-104	E CAPACITOR
	C26	QCFA1HZ-103	CAPACITOR
	C27	QCSA1HJ-121	CAPACITOR
	C28	QCSA1HJ-331	CAPACITOR
	C29	QCSA1HJ-391	CAPACITOR
	C31	QETC0JM-476	E CAPACITOR
	C32	QCFA1HZ-103	CAPACITOR
	C41	QER60JM-476	E CAPACITOR
	C50	QCFA1HZ-103	CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C51	QCFA1HZ-103	CAPACITOR
	C52	QCFA1HZ-103	CAPACITOR
	C53	QETC1CM-476	E CAPACITOR
	C54	QFV71HJ-563	M CAPACITOR
	C55	QCC11EJ-103	CAPACITOR
	C56	QETC1HM-105	E CAPACITOR
	C57	QCSA1HJ-330	CAPACITOR
	C58	QCFA1HZ-103	CAPACITOR
	C59	QCFA1HZ-103	CAPACITOR
	C61	QETA1AM-476	E CAPACITOR
	C111	QCFA1HZ-103	CAPACITOR
	C119	QCSA1HJ-131	CAPACITOR
	C120	QCSA1HJ-680	CAPACITOR
	C121	QCSA1HJ-680	CAPACITOR
	C122	QCSA1HJ-330	CAPACITOR
	C123	QCSA1HJ-8R0	CAPACITOR
	C125	QCFA1HZ-103	CAPACITOR
	C126	QCFA1HZ-103	CAPACITOR
	C127	QCFA1HZ-103	CAPACITOR
	C128	QCVB1CN-103	CAPACITOR
	L1	PU48530-101K	PEAKING COIL, 100 MICRO
	L2	PU59152-330J	PEAKING COIL, 33 MICRO
	L3	PU59152-181J	PEAKING COIL, 180 MICRO
	L4	PU48530-101K	PEAKING COIL, 100 MICRO
	L6	PU48530-101K	PEAKING COIL, 100 MICRO
	L15	PU59153-101K	INDUCTOR, 100 MICRO
	L16	PU59152-100J	PEAKING COIL, 10 MICRO
	L110	PU59152-100J	PEAKING COIL, 10 MICRO
	L111	PU59152-180J	PEAKING COIL, 18 MICRO
	L112	PU59152-560J	PEAKING COIL, 56 MICRO
	L113	PU59152-390J	PEAKING COIL, 39 MICRO
	BKT1	PQ42955	BOARD BRACKET
	ETH1	PQ40433-2	EARTH LUG
	SCW1	DPSP2606Z	SCREW, X2
	SCW2	DPSP2606Z	SCREW
	SLD1	PU60153	SHIELD CASE
	SLD2	PU60154	SHIELD PLATE
	SPC1	PU59210-001	W.LOKING SPACER, X3
	SPC2	WBS2600Z	T.L.WASHER
	WR1	PW30109-50AAZZ7	PARALLEL WIRE
	TP	PU56008	TEST-PIN, X3
	CN1	PU56258-10	CAP HOUSING
	CN2	PU58844-4	CAP HOUSING
	CN3	PU58844-2	CAP HOUSING
	CN4	PU58844-4	CAP HOUSING
	CN5	PU58844-8	CAP HOUSING

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* 24. FLYING ERASE BOARD ASSEMBLY <46> *
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	PWBA	PB30045A	FLYING ERASE BOARD ASSY
	Q1	2SA933S	TRANSISTOR
	Q2	2SC1741S(QR)	TRANSISTOR
	Q3	2SA933S	TRANSISTOR
	Q4	2SD639R	TRANSISTOR
	Q5	2SD639R	TRANSISTOR
	D1	UZ8.2BSC	ZENER DIODE
	D2	1SS133	DIODE
	R1	QRD161J-473	RESISTOR
	R2	QRD161J-472	RESISTOR
	R3	QRD161J-222	RESISTOR
	R4	QRD161J-473	RESISTOR
	R5	QRD161J-472	RESISTOR
	R6	QRD161J-104	RESISTOR
	R7	QRD161J-121	RESISTOR
	R8	QRD161J-104	RESISTOR
	R9	QRD161J-121	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C1	QCVB1CN-103	CAPACITOR
	C2	QCC11EJ-123	CAPACITOR
	C3	QCSB1HJ-560	CAPACITOR
	C4	QCBB1HJ-820	CAPACITOR
	C6	QCBB1HJ-820	CAPACITOR
	C8	QCT25UJ-181	CAPACITOR
	C9	QCT05UJ-330	CAPACITOR
	L1	PU48530-560J	PEAKING COIL, 56 MICRO
	L2	PU48530-3R3K	PEAKING COIL, 3.3 MICRO
	L3	PU48530-3R3K	PEAKING COIL, 3.3 MICRO
	L4	PU59152-101J	PEAKING COIL,100 MICRO
	T1	PU56175	S.TRANS
	SLD1	PU60408	SHIELD CASE
	SLD2	PU60409	SHIELD COVER
	SLD3	PU60410	SHIELD PLATE
	CN1	PU58844-3	CAP HOUSING
	CN2	PU58844-2	CAP HOUSING
	CN3	PU58844-2	CAP HOUSING

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* 25. SYNC SEP/SUB SERVO BOARD ASSEMBLY *
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	PWBA	PB30060B	SYNC SEP/SUB SERVO BOARD ASSY
		-SYNC SEP SECTION-	
	IC1	M52684P	IC
	OR	M52684AP	IC
	IC2	BU4013B	IC
	OR	TC4013BP	IC
	Q1	DTC114ES	TRANSISTOR
	R1	QRD161J-152	RESISTOR
	R2	QRD161J-271	RESISTOR
	R3	QRD161J-103	RESISTOR
	R4	QRD161J-103	RESISTOR
	C1	QER61HM-105	E CAPACITOR
	C2	QER61CM-106	E CAPACITOR
	C3	QCSB1HJ-220	CAPACITOR
	C4	QCXB1CN-152	CAPACITOR
	C5	QCVB1CM-103	CAPACITOR
	C6	QCVB1CM-103	CAPACITOR
	C7	QFN31HJ-222	M CAPACITOR
	C9	QCVB1CM-103	CAPACITOR
⚠	CF1	PU60086	RESONATOR
	CN1	PU58844-5	CAP HOUSING
		-SUB SERVO SECTION-	
	Q102	DTC124ES	TRANSISTOR
	D103	MA27TA	DIODE
	CN101	PU58844-2Y	CAP HOUSING
	CN103	PU58844-2R	CAP HOUSING
	CN105	PU58844-2Y	CAP HOUSING

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* 26. DECK TERMINAL BOARD ASSEMBLY <51><53> *
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	PWBA	PB20013B-03	DECK TERMINAL BOARD ASSY
		-DECK TERMINAL BOARD SECTION <51>-	
	PWBA1	PB20013B1	DECK TERMINAL BOARD ASSY
	R1	QRD181J-151	C RESISTOR
	R3	QRD181J-331	C RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PHS1	PU60271	PHOTO INTERRUPTER
	WR1	PW30110-26DD885	PARALLEL WIRE,DOES NOT INCLUDE
	CN1	PU59933-16	WIRE TRAP
		-REC SAFETY BOARD SECTION <53>-	
	PWBA3	PB20013A3	REC SAFETY BOARD ASSY
	S1	PU58644-1-3	REC SAFETY SWITCH

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* 27. RELAY BOARD ASSEMBLY <52> *
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	PWBA2	PB20013A2	RELAY BOARD ASSY
	LC1	PU59736-223	N FILTER
	LC2	PU59736-223	N FILTER
	WR2	PW30113-G0ABZ62	PARALLEL WIRE

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* 28. END SENSOR BOARD ASSEMBLY <54> *
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	PWBA	PB20013A4	END SENSOR BOARD ASSY
	Q1	PN268R-NC	PHOTO TRANSISTOR
	HO1	PQ31047	END SENSOR HOLDER
	CN1	PU59945-102	WIRE SOCKET

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* 29. CASSETTE HOUSING BOARD <56> *
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	PWBA	PB30043	CASSETTE HOUSING BOARD
	PWB1	PB30043	CASSETTE HOUSING BOARD
	Q1	PN268R-NC	PHOTO TRANSISTOR
	R1	QRD161J-471	RESISTOR
	PHS1	PU58879	PHOTO INTERRUPTER
	CN1	PU58844-106	CAP HOUSING

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